

Biological Recognition The Molecular Life Sciences Graduate Program

Graduate Handbook Fall 2007

Remarks:

This is the BioRec graduate handbook. The handbook will be revised regularly (1–2 times per year). Please check with the program coordinator, Sebastian Springer (s.springer@jacobs-university.de) for the current version. Last change is this document was on 07 June 2007.

The procedural rules in this handbook are labeled as Jacobs University rules, SES (School of Engineering and Science) rules, or BioRec rules. In case of conflict, Jacobs University rules (which are taken from the Graduate Policies at <http://www.jacobs-university.de/academics/policies/00945/>) always take precedence.

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1 The BioRec graduate program

1.1 General Description

Biological Recognition ("BioRec") is the graduate program for all molecular life sciences at the Jacobs University Bremen (Jacobs University). Its main aim is to comprehensively train students who join with a BSc (or generally after three years of study) for independent research work. BioRec graduates are qualified to work towards a PhD by research.

The following Jacobs University faculty are members of BioRec:

Area	Faculty Member	Research Interest
Biochemical Engineering	Marcelo Fernández Lahore	Downstream processing of biotechnological products
Biochemistry	Ulrich Schwaneberg	Biocatalyst engineering
	Albert Jeltsch	DNA Methylation, Enzyme mechanism and specificity, Protein DNA interaction, Protein engineering
Bioinformatics	Sebastian Springer	Molecular Immunology: Protein folding, assembly, and transport
	Martin Zacharias	Computer simulation of biomolecular association and conformational flexibility
Biology	Alexander Lerchl	The biological clock and its influences by environmental factors
Biophysics	Mathias Winterhalter	Quantitative models on interaction between molecules
	Jürgen Fritz	Single molecule biophysics and biosensors
Cell Biology	Klaudia Brix	Biomedical significance of cysteine proteinase-mediated extracellular proteolysis in epithelia.
	Nicole Kühl	IGF-binding proteins: implications for MS therapy
Computational Biology	Marc-Thorsten Hütt	Signal correlations in biological networks; genome signatures; analysis of spatiotemporal patterns
Microbiology	Matthias Ullrich	Thermo-regulated virulence gene expression in plant-associated bacteria
Molecular Biology and Genetics	Georgi Muskhelishvili	Coordinated alterations of gene activity
Neurobiology	Günther Zupanc	Neuronal mechanisms underlying structural plasticity in the adult central nervous system of vertebrates
Theoretical Physics	Hildegard Meyer-Ortmanns	Statistical physics of networks

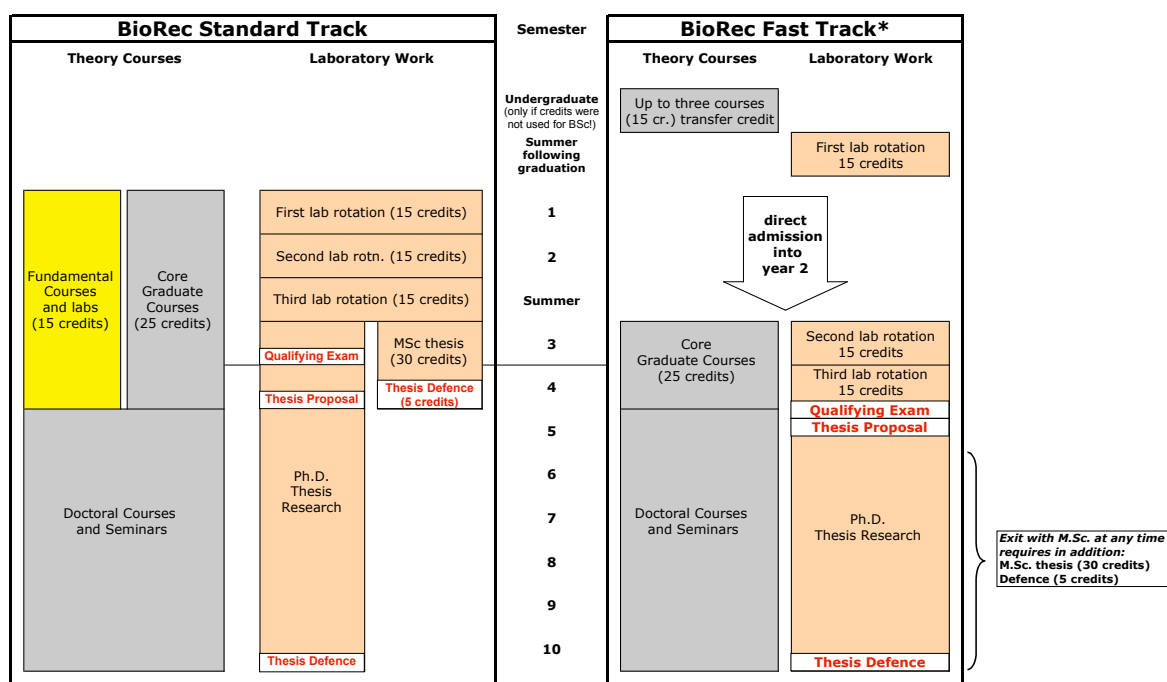
More detailed descriptions of the faculty member's research interests can be found on the BioRec website, or on their individual home pages.

The broad general focus of the program is the phenomenon of biological recognition which plays a central role on all levels of the life sciences today. Recognition requires not just an interaction (which could be strong or weak) but also a complementarity in shape and properties that elicits a specific event (like a conformational change in a protein) which leads to a qualitative response of the system. Recognition thus involves the reading and interpretation of complex patterns which can be at the molecular or organismic level. In the investigation of biological recognition events,

participating faculty aim to integrate their diverse scientific interests into a transdisciplinary concept. To this end, research performed in their groups and theoretical approaches in the different disciplines are presented and discussed jointly in a course on "Recognition and Cooperation". Shared lectures, literature seminars, methods courses, and the rotation of students between the groups guarantee scientific exchange and make the program a vigorous scientific unit.

1.2 General Structure of the Program

- The program takes two years to the MSc, and another three (altogether five) years to the PhD.
- The first stage, up to the MSc or the qualifying examination, is usually funded by a graduate stipend from Jacobs University. Additional non-funded spaces may be offered to applicants.
- The first academic year is dedicated to course work and three laboratory rotations (see section of about 60 days each, to be done in the laboratories of the BioRec faculty. The purpose of these lab rotations is for students to become acquainted with the research and methods in order to be able to choose a laboratory for the MSc and/or PhD thesis.
- The second academic year is dedicated to the MSc thesis (which is usually done in one of the rotation labs), and additional course work. The MSc stage is concluded
 - **either** by the submission of an MSc thesis and its defence,
 - **or** by passing a qualifying examination, usually held in January of the second academic year. The qualifying examination constitutes no degree but it allows the student to immediately continue working towards the PhD without having to submit or defend an MSc thesis.
- For Jacobs University graduates (those students who concluded undergraduate studies at Jacobs University with a BSc degree) who have very good grades, BioRec offers the possibility of a "Fast Track" which allows them to begin with their PhD research work after only one year. See section 3.
- After completion of the MSc thesis or the qualifying exam, students may (upon consent of a BioRec faculty member) continue their studies towards the PhD. Funding for this stage comes from the respective laboratory.
- The following scheme gives a general overview over the way to the MSc and PhD, comparing the standard and fast tracks:



1.3 Specific Training Aims

BioRec aims to train students:

- to reach subject knowledge in their area of interest, and in the molecular life sciences in general, which allows them to understand the current state of the field, current problems and directions, and modern methodology;
- to understand that scientific knowledge is constantly evolving, and to be able to independently obtain and update their subject knowledge as above;
- to design, understand, and critique experimental approaches;
- to carry out research work in a precise, diligent, and reproducible manner;
- to understand the value and challenges of, and to practise, interdisciplinary approaches;
- to develop their own career perspective.

1.4 Career Perspectives for Graduates

Students who graduate from BioRec with an MSc (or qualifying examination) are qualified to pursue research work towards a PhD. While a PhD is usually the condition for a high-level scientific position, MSc graduates may also find employment in industry or government institutions, or proceed to an additional graduate degree.

2 Admission to BioRec

- Application to BioRec is through the Graduate Office of the School of Engineering and Science. Application procedures are as for all Jacobs University graduate programs as published on the Jacobs University web site. As a specialty, BioRec requires that applicants submit a statement of their practical research experience.
- Applicants are screened and selected by the BioRec admission committee.
- Initial admission to BioRec is valid up to the award of the MSc. It does not imply admission to PhD studies after the award of an MSc. Students who have completed their MSc or their qualifying examination may apply to individual investigators in the program to continue with PhD research. Funding for the PhD research then comes from the individual investigator's laboratory.
- The admission committee cannot admit students to PhD studies by research only. Students who seek admission to do a PhD by research must address individual investigators. Funding for the PhD research then comes from the individual investigator's laboratory.

3 The BioRec Fast Track

(BioRec rules)

3.1 Admission to the Fast Track

- After admission to BioRec, Jacobs University graduates may apply to take the BioRec Fast Track. The Fast Track is accessible to Jacobs University graduates who:
 - have enough 'excess' undergraduate credits to transfer 15 credits in eligible courses into their graduate studies. Eligible credits are those from the courses defined in sections 6.3.1. and 6.4 to 6.7 of this handbook.
 - can fulfill their mandatory course requirements (see section 6.3) with courses taken in their third year as Jacobs University undergraduates (see below section 3.3),
 - and can start their first laboratory rotation by July 1st of their year of admission (see below section 3.4.1).

Students who do not fulfill this condition are generally not admissible to the Fast Track. Exceptions may be defined by the admissions committee upon written application.

- Admission to the Fast Track is decided upon by the admissions committee of BioRec. No later changes are possible. The coordinator of BioRec transmits this information to the Dean's Office (Svenja Frischholz).
- To students who hold a degree from another university, BioRec Fast Track is accessible only if they are available to start their first lab rotation on July 1st before their admission, and they pass an oral examination (to be held in orientation week at the latest) which demonstrates scientific standing in theory and practice equivalent to an Jacobs University graduate in BCE, BCCB, BICB, or Biology with a GPA ≤ 2.0 . Such students must contact the admission committee by their own initiative.
- Students are notified of their admission to the Fast Track by a letter from the Dean's Office (Svenja Frischholz).

3.2 Stipends in the Fast Track

- FastTrack stipends begin in July, with the first lab rotation, and end at the end of August of the coming year (14 months total).

3.3 Credit Transfer to the Fast Track

- Jacobs University students can take up to three graduate courses while they are still undergraduates. These courses will be awarded transfer credits (TC) in the BioRec Fast Track. They must come from the list of BioRec courses or BioRec electives. These courses must not be used for graduating with the BSc otherwise they are "used up" and cannot be used for transfer credits.
- Since most of the graduate courses in the BioRec program are held in a two-year cycle (for example, 530421, 530501, 530441) it will be necessary for Fast Track students to take these courses already during their third undergraduate year.
- The courses which will receive transfer credits appear on a student's BSc diploma. Students must then identify to the BioRec coordinator the courses which they want to transfer, and the coordinator certifies the transfer to the registrar.

3.4 Studying in the Fast Track

3.4.1 Summer lab rotation

- BioRec Fast Track students do their first lab rotation in the summer after their BSc graduation, starting July 1st, for two months, full-time (40 hrs/week).
- They register for the rotation until June 30th. The drop-add phase is the first week of July.

- Fast track students have, from their undergraduate time at Jacobs University, still an Jacobs University enrollment certificate which is valid until the end of August. After this, they receive a new one.

3.4.2 Further coursework

- BioRec Fast Track students then perform two additional lab rotations (September to January and February to April).
- They must also take the core graduate courses of BioRec (25 credits). Core graduate courses in BioRec (credits in brackets): Recognition and Cooperation (5), 3 x literature seminar (7.5), Student Research Presentation (2.5), Track-specific first course (5), Track-specific second course (5). It is important to note that our BioRec courses still do not have to be offered every year since Jacobs University students have access to them already in the last year of their undergraduate studies.
- After the spring semester, they do their qualifying exam. At this time, they have accumulated 45 credits from lab work and 40 credits from courses, = 85 credits in total.
- They then continue with their PhD work. If at any time, they want to leave BioRec without a PhD, they can be awarded an MSc if they write up an MSc thesis (30 credits) and pass an MSc examination (5 credits). (For this, the current course "Advanced Practical Research" is from 2007 on integrated into the Master's thesis in both Tracks of BioRec, Standard and Fast.) This then gives them the 120 credits necessary to get an MSc.

3.5 Status of students in the Fast Track

- By German law, students in the BioRec Fast Track do not count as MSc students. They receive an Jacobs University enrollment certificate (which says "student" on it) but for tax purposes they are liable to pay social insurance.
- This changes when a student exercises the MSc option to leave with an MSc.
- Further information is available from the Registrar.

4 Entry assessment of students

(BioRec rules)

- BioRec students from outside do not normally have access to the Fast Track. They attend the normal five-year program ("Standard Track"). See also section 3.1.
- In the first week of term, students entering BioRec from outside Jacobs University will undergo a written assessment test which consists of ten questions each from the areas of biochemistry, cell biology, molecular biology, genetics, biophysics, structural biology, general biology, and bioinformatics. The results of the test are shared with all BioRec faculty. They will not be used for grading but to assess the areas of knowledge of a student.
- In the assessment test, the student also indicates the preference for an academic advisor from a certain area.
- When the assessment test is graded, the student and her/his academic advisor draw up a plan of "**fundamental courses**" (lectures or labs, 15 credits). Examples of such courses are:
 - Second-year courses from the four undergraduate majors (Examples: Advanced Biochemistry and Molecular Biology, Advanced Cell Biology, Advanced Biology B.)
 - Second-year lab modules (subject to availability of spaces). (Example: Advanced Biochemistry Lab Course.)
 - Mathematics courses. (Example: Engineering and Science Mathematics.)
 - Chemistry courses. (Example: Advanced Organic Chemistry I, Advanced Physical Chemistry, Biophysical Chemistry.)

This will make sure that if the student has knowledge or skill deficiencies for the area which they intend to specialize in in BioRec, they can be alleviated.
- The student must adhere to this course plan.
- The course plan will be formally reviewed by the student and the supervisor at the end of each semester, and a plan for the next semester will be made.

5 Student advising and academic integrity

(BioRec rules)

5.1 Advising

- When the admissions procedure is complete, the head of the BioRec admissions committee (2006: Martin Zacharias) assigns an academic advisor to each beginning BioRec student. The assignment is usually made on the basis of the choice that a student made during the assessment test.
- The role of the academic advisor is similar to that of an academic advisor for an Jacobs University undergraduate. Especially, the academic advisor
 - Advises the student on her/his choice of courses, and in the case of external students, helps to set up the mandatory plan of fundamental courses;
 - Agrees to the advisee's choice of courses in CampusWeb;
 - Serves as the first point of contact for the student in case of academic or other difficulties.
- Students can change their academic advisor using Jacobs University's standard academic advisor change form.

5.2 Academic Integrity

- BioRec students are, like undergraduate students, bound by Jacobs University's Code of Academic Integrity (as published on Jacobs University's Website).
- Plagiarism (copying without attribution) in course work or reports carries an automatic grade of 5 (fail) in the respective course.
- In addition, when working in research, graduate students are subject to Jacobs University's "Guidelines to Ensure Good Academic Practice and for Handling Academic Misconduct in Teaching and Research" as published on Jacobs University's website.
- For violations, the sanctions outlined in the respective documents apply.

6 The Course Program in BioRec

6.1 BioRec courses - Overviews

These are the course requirements for students who started BioRec in 2006 and later. For an overview of courses and course requirements for those students that started in 2004 and 2005 please see Section 12.

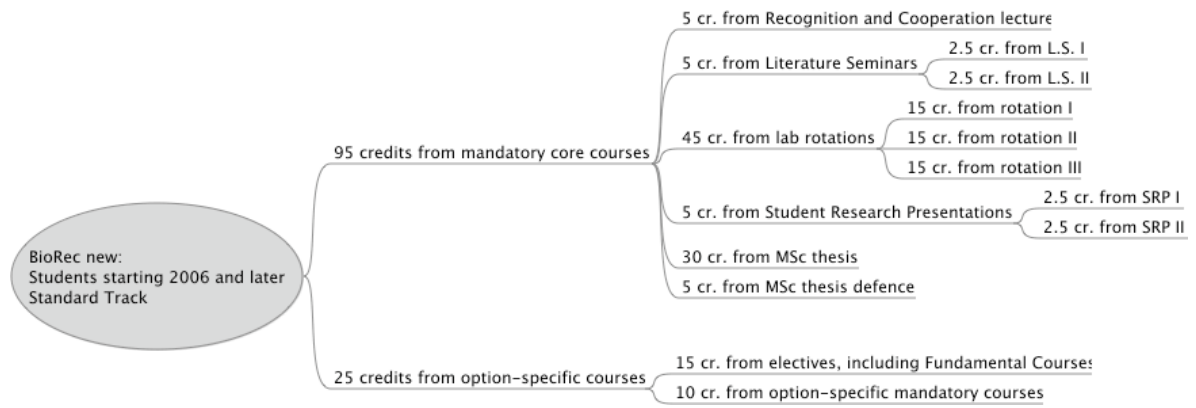
6.1.1 Overview - Standard Track

semester	Mandatory Core Courses: Mandatory for both options to be taken in the specified semesters	ECTS credits
1 (Fall)	530451 Recognition and Cooperation	5
	530411 Literature Seminar I	2,5
	530401 First Lab Rotation	15
2 (Spring)	530422 Student Res. Presentations I	2,5
	530421 Student Research Presentations II	2,5
	530412 Literature Seminar II	2,5
	530402-A Second Lab Rotation	15
	530402-B Third Lab Rotation	15
3 (Fall)	Master's thesis	30
4 (Spring)	Master's Thesis Defence	5
Sum of credits required:		95

Option-specific mandatory courses for Option A: (Not offered every year; to be taken when offered)		
530421	Biological Thermodynamics, Kinetics, and Separation	5
530521	Protein Design and Evolution	5
Sum of credits required from option-specific mandatory courses:		10
Electives according to list, including student-specific Fundamental Courses (electives list to be approved by academic advisor)		15
Grand total Option A:		120

Option-specific mandatory courses for Option B: (Not offered every year; to be taken when offered)		
530421 OR 530441	Biological Thermodynamics, Kinetics, and Separation Physiology and Pathophysiology	5
530501 OR 530511	Molecular, Cell, and Developmental Biology Molecular Genetics	5
Sum of credits required from option-specific mandatory courses:		10
Electives according to list, including student-specific Fundamental Courses (electives list to be approved by academic advisor)		15
Grand total Option B:		120

The following scheme summarizes the credit requirements for the Standard Track:



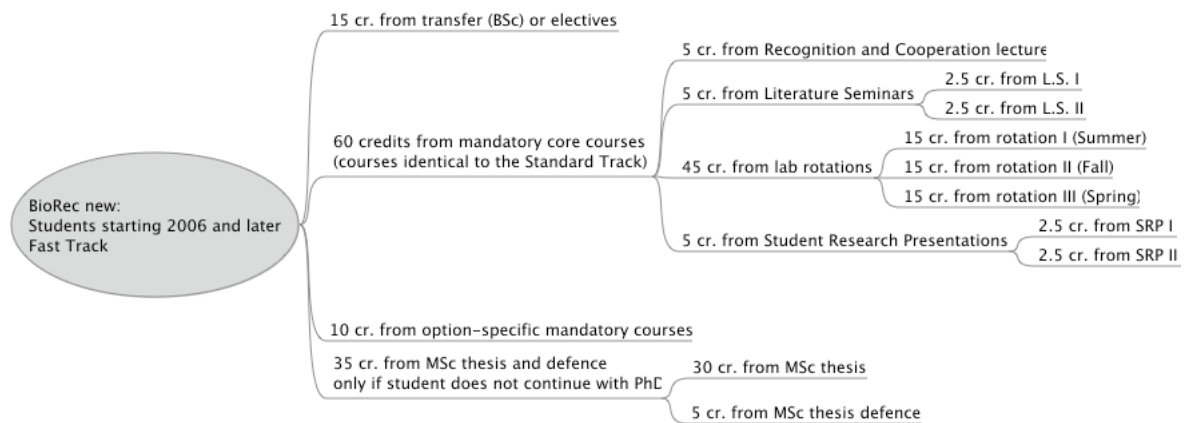
6.1.2 Overview - Fast Track

semester	Mandatory Core Courses: Mandatory for both Options, to be taken in the specified semesters		ECTS credits
1 (Fall)	530451	Recognition and Cooperation	5
	530411	Literature Seminar I	2,5
		First Lab Rotation - Fast Track - Summer (July and August)	15
		Second Lab Rotation - Fast Track - September to January	15
2 (Spring)	530422	Student Res. Presentations I	2,5
	530421	Student Research Presentations II	2,5
	530412	Literature Seminar II	2,5
		Third Lab Rotation - Fast Track - February to April	15
After the third rotation, the qualifying exam is held and the student either continues with the MSc thesis or, if the qualifying exam is passed, directly begins work on the PhD thesis in which case no MSc is awarded.			
3 (Fall)	Master's thesis		30
4 (Spring)	Master's Thesis Defence		5
	Sum of credits required:		95

Option-specific mandatory courses for Option A: (Not offered every year; to be taken when offered)		
530421	Biological Thermodynamics, Kinetics, and Separation	5
530521	Protein Design and Evolution	5
	Sum of credits required from option-specific mandatory courses:	10
	Transfer Credits or Electives according to list	15
	Grand total Option A:	120

Option-specific mandatory courses for Option B: (Not offered every year; to be taken when offered)		
530421	Biological Thermodynamics, Kinetics, and Separation	5
OR	530441 Physiology and Pathophysiology	
530501	Molecular, Cell, and Developmental Biology	5
OR	530511 Molecular Genetics	
	Sum of credits required from option-specific mandatory courses:	10
	Transfer Credits or Electives according to list	15
	Grand total Option B:	120

The following scheme summarizes the credit requirements for the Fast Track:



General Academic Issues and information

6.1.3 Pass Option (Jacobs University rule)

Undergraduate Students at Jacobs University have the possibility to designate courses as "pass only". No such possibility exists for graduate students at Jacobs University, and therefore this is impossible in BioRec, too.

6.1.4 The course descriptions of the BioRec courses

are published on CampusWeb.

6.1.5 ECTS credits (German legislation)

In general, one ECTS credit corresponds to 30 hours of student workload. This includes classes themselves, studying, and preparation time for examinations.

6.1.6 Accreditation of BioRec, and Modularization of the course program

BioRec will be accredited as a graduate program by the German authorities as soon as possible. One condition for this is the modularization of the course program. The accreditation procedure will not affect the studies of BioRec students.

6.2 The two options of study in BioRec

- BioRec has two options of study (= different areas of specialization). Before the fall of 2006, they were called "tracks", but they have been renamed because of the new "Fast Track" (see section 3).
- The options are:
 - **Option A: Structure, Design, and Activity of Biomolecules** focuses on the atomic and molecular aspects of biomolecules, on computing, prediction, design, and molecular mechanism.
 - **Option B: Interactions, Functions, and Organismic Role of Biomolecules** focuses on the cellular and organismic aspects of biomolecules, their interaction, and their role in greater assemblies up to the level of the organism.
- In practice (2006), the two options are quite closely related. This may change in the future, and other options may be added.
- At the beginning of their study in BioRec, students must declare one option towards their academic advisor. They are permitted to change later if they meet the course requirements of the other options.
- Which courses are mandatory for you depends on which track the student chooses. Some courses are mandatory for both tracks and some are mandatory for one track only. Courses that are mandatory for another track can always be taken as electives.

6.3 Mandatory Courses in BioRec

All course descriptions can be found on the Jacobs University website.

6.3.1 List of mandatory courses

Course number	Course Name	ECTS Credits	Status Option A	Status Option B
530451	Recognition and Cooperation in Biological Systems	5	mandatory	mandatory
	First/Second/Third Lab Rotations	15 ea.	mandatory	mandatory
530411/2	Literature Seminar I + II	2.5 ea.	mandatory	mandatory

Course number	Course Name	ECTS Credits	Status Option A	Status Option B
	Student Research Presentations I + II	2.5 ea.	mandatory	mandatory
530421	Biological Thermodynamics, Kinetics, and Separation	5	mandatory	this or 530441 mandatory
530521	Protein Design and Evolution	5	mandatory	elective
530441	Physiology and Pathophysiology	5	elective	this or 530421 mandatory
530501	Molecular, Cell, and Developmental Biology	5	elective	this or 530511 mandatory
530511	Molecular Genetics	5	elective	this or 530501 mandatory

6.3.2 Remarks on specific courses

6.3.2.1 *Literature Seminar I + II*

These courses can be taken again in BioRec if they were previously taken when the student was an undergraduate in one of the Life Sciences Majors at Jacobs University. This is because the topic of the courses change from year to year.

6.4 Elective courses offered specifically for BioRec

All course descriptions can be found on the Jacobs University website.

Course Number	Course Name	ECTS Credits	Elective in Option A	Elective in Option B
530461	Techniques for the analysis and structure determination of Biomolecules I		yes	yes
530561	Techniques for the analysis and structure determination of Biomolecules II		yes	yes
200482	Networks		yes	yes
530471	Metabolic Engineering		yes	yes
530421	Biological Thermodynamics, Kinetics, and Separation		no	yes (if not taken as a mandatory course)
530521	Protein Design and Evolution		no	yes
530441	Physiology and Pathophysiology		yes	yes (if not taken as a mandatory course)
530501	Molecular, Cell, and Developmental Biology		yes	yes (if not taken as a mandatory course)
530511	Molecular Genetics		yes	yes (if not taken as a mandatory course)
530481	Design principles of biological networks	2.5	yes	yes
(no number yet)	Advanced Behavioral Neurobiology I	2.5	yes	yes

Course Number	Course Name	ECTS Credits	Elective in Option A	Elective in Option B
(no number yet)	Advanced Behavioral Neurobiology II	2.5	yes	yes

6.5 Undergraduate Courses that are especially recommended as electives for BioRec students

Course Number	Course Name	Elective in Option A	Elective in Option B
520331	Quantitative Analysis of Biochemical Data	yes	yes
560301	Design of Biological Molecules and Systems I	yes	yes
560302	Design of Biological Molecules and Systems II	yes	yes

6.6 Other Undergraduate Courses which count as electives in BioRec

This list may not be complete. Additions and exceptions can be determined by BioRec faculty in cooperation with the coordinator. All course descriptions can be found on the Jacobs University website.

Course Number	Course Name	Elective in Option A	Elective in Option B
520201	Advanced Biochemistry and Molecular Biology I	yes	yes
520202	Advanced Biochemistry and Molecular Biology II	yes	yes
520321	Advanced Biochemistry and Molecular Biology III	yes	yes
500321	Methods and Research Strategies in the Life Sciences	yes	yes
520331	Quantitative Analysis of Biochemical Data	yes	yes
500351	Introduction to Biophysical Chemistry I	yes	yes
500352	Introduction to Biophysical Chemistry II	yes	yes
560301	Design of Biological Molecules and Systems I	yes	yes
560302	Design of Biological Molecules and Systems II	yes	yes
400211	Advanced Physical Chemistry I	yes	no
400212	Advanced Physical Chemistry II	yes	no
400301	Computational Chemistry and Biochemistry	yes	no
550331	Basic Concepts of Modeling Dynamics in Biology	yes	no
320431	Dynamical Processes on Complex Networks	yes	no
520322	Immunology	no	yes
500311	Biomedicine and Infection Biology	no	yes
520342	Molecular Biology and Genomics	no	yes

Course Number	Course Name	Elective in Option A	Elective in Option B
520211	Advanced Cell Biology I	no	yes
520212	Advanced Cell Biology II	no	yes
500211	Advanced Biology B I	no	yes
500212	Advanced Biology B II	no	yes
550331	Basic Concepts of Modeling Dynamics in Biology	yes	yes

6.7 Courses from other graduate programs which count as electives in BioRec

This table has not yet been compiled. Students who are interested in taking courses from other graduate programs as BioRec electives should contact their academic advisor and the coordinator. All course descriptions can be found on the Jacobs University website.

Course Number	Course Name	Elective in Track A	Elective in Track B
(tbc)			

7 Laboratory Rotations (BioRec rules)

- Students carry out three research laboratory rotations each during their first year. The name "laboratory rotations" includes, of course, research rotations in computational and theoretical groups which have no laboratories.
- Lab rotations carry 15 ECTS credits each.
- The rotations take place in the following time slots:
 - First rotation: September 1 - January 31
 - Second rotation: February 1 - April 30
 - Third rotation: May 1 - July 31.
- The rotations for **the BioRec Fast Track** take place in the following time slots:
 - First rotation: July 1 - August 31 (for this rotation, there is a presence requirement of five days per week)
 - Second rotation: September 1 - January 31
 - Third rotation: February 1 - April 30.
- The minimum working time for a single lab rotation (15 ECTS credits) is 450 hours, or 56 full working days (including preparations and writing the protocol). For the time in the lab, presence requirements apply (see below).
- The lab rotations are subject to the rules set up by the instructor of record. The following set of rules was current in September, 2006. Newer rules may apply (check with the instructor of record):

Lab rotations within BioRec

Lab rotations within BioRec are mandatory courses for which the following deadlines apply. Violation of these results in downgrading or even failing the courses. The collection of these rules has to be printed and SIGNED by the student and handed-in to the IoR (Instructor of Record, Dr. N. Kühl, room 54 Res. II) of the lab rotations until Sept 21st.

course	time	time slot	decision form due	start report the latest on	report due	grades due
rules signed			Sept 21 st			
lab rotation 1	FS	Sept 01 - Jan 31	Sept 21 st (first LR)	Jan 20th	Feb 1st	Feb 10th
lab rotation 2	SS	Feb 01 - Apr 30	Jan 10 th (next LR)	Apr 20th	May 1st	May 10th
lab rotation 3	SS	May 01 - Jul 31	Apr 10 th (next LR)	Jul 20th	Aug 1st	Aug 10th
thesis lab	FS	Sept 01 - Jan 31	Jul 14 th (thesis lab)			
Vacation		01. -31 Aug				

FS: fall semester, SS: spring semester. (Grades for third rotation due Aug 30th when holidays are taken before Aug)

- **Definition:** Lab rotations are practical research courses. The students are expected to spend a **minimum** of 3 full days per week in the lab of the host PI. The principal working hours are 8 am to 5 pm. Depending on the research project, the working hours might be adjusted. However, both students and PIs have to take into account that **no one** is allowed to work alone in the lab.
- **Distribution/choosing lab rotations:** The students decide on the basis of the project descriptions within the BioRec program folder and the talks in the Recognition and Cooperation/Faculty research presentations lecture. So far, students are not distributed but choose. This might change when the student numbers drastically increase.
- **Time frame:** Lab rotations are scheduled in the above noted slots. Each lab rotation consists of the practical work and writing the report. Therefore, about 10 days before the end of the rotation the students have to stop their practical work and to start summing up the lab work. The report is due to the PI on the first day of the next rotation.
- **Lab decisions:** About three weeks before the next rotation (exact dates given above) the students have to decide in which lab they want to perform the next rotation. They have to make sure that before that date the next host PI signs the **official** form that confirms acceptance and states the name, lab rotation number, and a running title as well as the deadline for the report. The form has to be handed to the IoR before the deadline. Each week of delay will result in a grade **reduction of 5%** for this rotation.

- **External lab rotations:** that is rotations outside IUB or with non-BioRec faculty are **NOT** possible. This policy has changed.
- **Vacation:** If students want to leave IUB for vacation or any other reason for more than 1 continuous week, the IoR of the lab rotation courses has to be informed in written at least 2 weeks in advance. Any vacation in addition to the general summer vacation in August has to be applied for in written form with a) the host PI of the lab rotation and b) the IoR.
- **Lab report:** Each lab rotation has to be summarized in form of a report. The reports should have the format of a small publication. The specific contents and length depend on the host PI. (However, the PIs should take into consideration that the reports may be part of the M.Sc. thesis). In addition, host PIs should have the student present their work in the group meeting and may ask for the lab book to be handed-in as well. The host PIs hand-in three grades:
 1. grade for the report (lab book, presentation, if applicable)
 2. grade for lab performance
 3. final grade in form of IUB grades
- **Report deadline:** All reports have to be handed-in by the students meeting a deadline that is given by the host PI and allows the host PI to give the grades to the IoR meeting the deadline dates (given above). Not meeting with deadlines given by the PI or IoR, affects the grade of the rotation (5 % per week).
- **Failing lab rotations:** Lab rotations are mandatory courses. If a student is about to fail a lab rotation (grade 4.67 or worse), the responsible PI informs the IoR and the student the latest 4 weeks before the end of the deadline about this prospect to allow for interference. When the attempt to avoid the fail is not successful, the student does NOT have the possibility to repeat the lab rotation. Failing a lab rotation unmistakably demonstrates a lack of seriousness in the pursuit of a scientific career and the student is therefore, expelled from the program after the end of the first year of the BioRec program.
- **Thesis lab:** Before the end of the third rotation the students have to decide in which lab they want to perform their thesis work (date given above). The students have to hand-in the acceptance form before the deadline given below.
- **Funding:** As within BioRec financial support is not given for Ph.D. positions, PIs can offer positions to students when they have external funding or when the students themselves have applied for funding e.g., through the DAAD.
- **Internships:** are different from lab rotations. Internships are performed off campus, are not mandatory, not part of the BioRec program and do not earn credits. All BioRec students are

allowed to perform internships during their vacation time (August). If students want to extend this time they may apply with a) their lab rotation 3 host PI and b) the IoR for the following agreements that would allow for extended internships:

- LR 3 is finished within 2 instead of 3 month. The student spends therefore, 5 full days in the lab instead of 3. This is only possible if the research project is suitable for such a time compression and if the PI agrees. Students interested in such a regulation have to make sure that they discuss this issue with the host PI before starting rotation 3.

- If the PI agrees, the student has to write a letter to the IoR that states

- the students name,
- the host PI name,
- the agreement that the time frame is compressed,
- the new deadline for the report and other grade-relevant parts of the LR,
- the name of the internship host with full address and
- either a contact phone number or e-mail that allows for contacting the student during the internship.

This letter has to be **signed by both** the student and the BioRec host PI and has to be handed to the IoR at least 4 weeks before the intended start of the internship.

- **Changes or exceptions:** can only be **applied** for **IN ADVANCE**. After the deadline, the IoR does not accept any excuses.

I have read and understood all contents of this collection of rules.
Student name (PRINT)

Signature

8 Progress Monitoring

8.1 Jacobs University rules

- Students in integrated PhD Programs who receive a semester grade point average worse than 3.0 and who do not receive at least 20 ECTS credit points in any single semester of the coursework phase will be placed upon Academic Probation. The Student, the Academic Advisor, and the Dean will be informed by the University Registrar. Thereafter, the Student must achieve a semester grade point average 3.0 or better and at least 20 ECTS credit points in each of the two successive semesters in which the Student enrolls at Jacobs University in order to be restored to good academic standing. Failure to do so will result in suspension from the University.
- Any Student whose cumulative grade point average in any given semester is worse than 4.33 will automatically be suspended from the University.

8.2 SES rules

The School of Engineering and Science may have, or implement, additional procedures to monitor the progress of graduate students. They can be obtained from the Dean's office.

8.3 BioRec rules

- There are no provisions for the failure of mandatory courses. Especially, as a general rule, it is not possible to repeat a lab rotation if it has been failed.
- It is very important that all students conform to the presence requirement of the lab rotations (see section 7).
- If a student is obviously not conforming to the rules of the program (for example, by not attending mandatory courses) the coordinator must, in cooperation with the student's academic advisor and the instructor of record of the respective course, and after consultation with the student, ask the Dean to have the student's stipend terminated, and the student excluded from the program.

9 The qualifying examination

This section will be completed at a later date. For information, talk to the program organizer.

10 The Master of Science thesis and Defence

10.1 Conditions for submission

The MSc thesis is submitted at the end of the period provided for the practical work. In the standard track, this is at the end of the fourth semester (see section 10.3). In the Fast Track, an Msc thesis can be submitted if completion of a PhD thesis is not intended. In this case, the time and circumstances of submission must be assessed individually.

10.2 Contents of the thesis

10.2.1 Jacobs University rules

The cover page needs to show the title of the Master's Thesis, the name of the School or Center, the University's name, the month and year of submission, the name of the Student and the names of the two Reviewers. Furthermore, the Thesis needs to contain a declaration signed by the Student submitting the Master's Thesis that the Thesis is independent work that has not been submitted elsewhere.

10.2.2 BioRec rules

- The thesis should in general be about 30 pages (Arial or Times 11 point, 1.5 line spacing, 3 cm margins) including everything. The absolute maximum is 50 pages.
- The thesis should have the parts Introduction, Materials and Methods, Results, Discussion, and References.
- Methods should be reported if they are different from published methods. Published methods must be referred to.

10.3 Time and Circumstances of Submission

10.3.1 Jacobs University rules

- By the end of the fourth semester, Students must submit a Master's Thesis to the Registrar's Office. The following number of copies must be submitted:
 - one hard copy per Examiner¹,
 - one hard copy and a pdf version for the Registrar's Office,
 - one hard copy for the Dean's Office.

10.3.2 BioRec rules

- There are two dates for the submission of the MSc thesis: May 15th, for graduation at Jacobs University's graduation ceremony in the first week of June, and August 15th, for graduation at the Academic Opening on the first week of September.
- The student's MSc thesis supervisor (not: academic advisor) is responsible for fixing the submission date and for sending a note about the submission date to the program organizer and the student's academic advisor.
- At the time of submission, students need to indentify a second reader (see below 10.4.2). They must submit PDF files of the thesis directly to their supervisor, to the second reader, and to the third examiner.
- Students who do not meet the submission date on August 15th are excluded from the program by default unless they can show to the registrar a written exemption from the Dean.

¹ (in BioRec, there are two examiners)

10.4 Grading of the MSc thesis

10.4.1 Jacobs University rules

- Each Examiner must submit the completed "Master's Thesis Evaluation" form to the Registrar's Office within four weeks after receiving the Thesis. The grades of all Examiners are averaged and rounded to the next Jacobs University grade.

10.4.2 BioRec rules

- The MSc thesis is graded by two faculty members. One is the MSc thesis advisor. The other is picked by the student. The student is responsible for finding a second reader before the submission date.
- The MSc thesis is graded within one week after the submission. It is the responsibility of the student's MSc thesis supervisor (not: academic advisor) to ensure this.
- The thesis is graded and appears on the transcript with 21 credits (30 credits starting in 2007).

10.5 Master's Thesis Defence

10.5.1 Jacobs University rules

- *Jacobs University rules foresee a "Master's Examination" to be held prior to the start of the thesis. In BioRec, there is no such examination. Instead, the thesis is concluded with a Thesis Defence.*

10.5.2 BioRec rules

- **Timing:** The Master's Thesis Defence is held on May 24th and 25th for the first submission date, and on August 24th and 25th for the second submission date. If these days are weekends or holidays, the next working days are used. The early submission dates (compared to Jacobs University's general policy) are necessary to make sure the referees can read the thesis and the exam can take place.
- **Preparation:** It is the responsibility of the student to identify and notify the examiners, to find a time at which the examination can be held, and to communicate this to her or his thesis supervisor.
- **Content:** The Master's Thesis Defence is a thesis-oriented examination which deals with the experimental contents of the thesis, and its theoretical background.
- **Examination:**
 - The Defence is not public. The student and three faculty members attend. Two are those who read and graded the thesis. The third is another faculty member whom the student must select at least one week in advance of the examination date.
 - The duration of the Defence is typically about an hour (minimum 30 minutes).
 - The Defence starts with the student explaining the outline of the work, and the results achieved. For this, no presentation aids apart from the thesis and the board are permitted (especially, no Powerpoint presentations or transparencies). Questions of the faculty follow.
- **Grades and Credits:** The Defence is graded and appears on the transcript with five credits.
- It is the responsibility of the student's MSc thesis advisor (not the academic advisor) to pass on, in writing, the results of the grading of the MSc thesis, and the results of the Thesis Defence, to the Registrar.

11 The doctoral thesis work and thesis defence, and the PhD degree

The PhD thesis work, the thesis, and its defence in BioRec follow the general Jacobs University rules published on the website, and the special regulations of the School and Engineering and Science that are available from the Dean's office. This regards especially

- The presentation of the research proposal after six months of PhD research work
- The length, form, and contents of the PhD thesis
- The timeline of submission of the PhD thesis
- The publication of the PhD thesis (to conform to German regulations)
- The admission to the doctoral examination
- The number and choice of the examiners, and the arrangements for the examination
- The structure of the doctoral examination
- The awarding of the PhD degree.

12 Appendix: Regulations for students graduating in 2007

For students who started BioRec in 2005, and who graduate in 2007, a different course plan is valid. This is because the course plan in BioRec changed in summer, 2006, but this affected only students starting in fall, 2006, or later.

The old course plan leads to a different course requirement compared to students who started later. The following are the required courses for these students:

BioRec course scheme version July 28, 2005

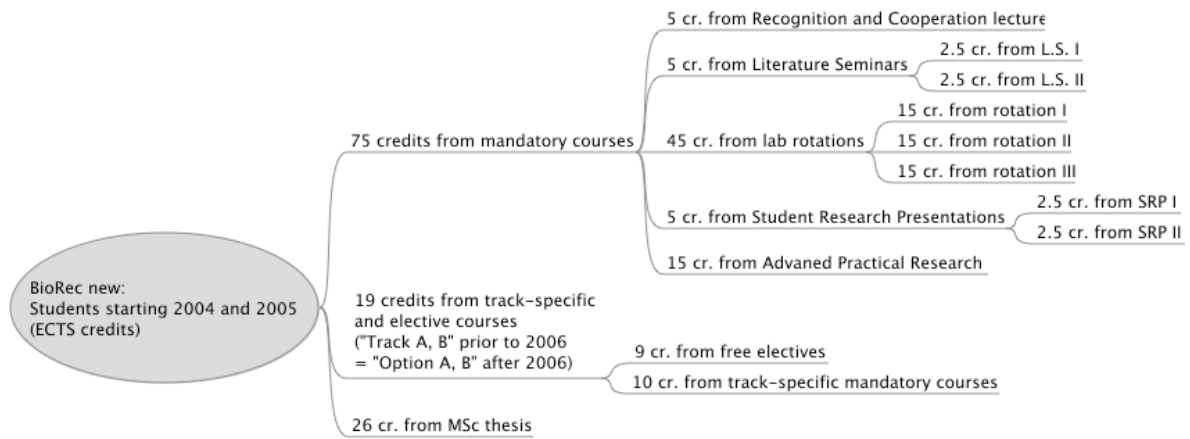
semester	Mandatory for both tracks, to be taken in the specified semesters:		ECTS credits
1 (Fall)	530451	Recognition and Cooperation	5
	530411	Literature Seminar I	2,5
	530401	First Lab Rotation	15
2 (Spring)	530422	Student Res. Presentations I	2,5
	530412	Literature Seminar II	2,5
	530402-A	Second Lab Rotation	15
	530402-B	Third Lab Rotation	15
3 (Fall)	530571	Advanced Practical Research	15
	530421	Student Research Presentations II	2,5
January	Qualifying Examination		
Sum of credits required:			75

Mandatory for Track A: (Not offered every year; to be taken when offered)		
530421	Biological Thermodynamics, Kinetics, and Separation	5
530521	Protein Design and Evolution	5
Credits from electives		9
Sum of credits required:		19
Total credits Track A (mandatories both + mandatories A + electives) :		94
Thesis gives in addition:		26
Grand total track A:		120

Mandatory for Track B:		
530421	Biological Thermodynamics, Kinetics, and Separation	5
OR		
530441	Physiology and Pathophysiology	
530501	Molecular, Cell, and Developmental Biology	5
OR		
530511	Molecular Genetics	
Credits from electives		9
Sum of credits required:		19
Total credits Track B (mandatories both + mandatories B + electives):		94
Thesis gives in addition:		26
Grand total track B:		120

Electives:		
530461	Techniques for the Analysis and Structure Determination of Macromolecules I	2,5
530561	Techniques for the Analysis and Structure Determination of Macromolecules II	2,5
520331	Quantitative Analysis of Biochemical Data	2,5
200482	Networks	1,25
530471	Metabolic Engineering	2,5
530421, 530521, 530441, 530501, and 530511 also count as electives where they are not mandatory. Some undergraduate courses can also count as electives.		

The following scheme summarizes the credit requirements:



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