THE HEBREW UNIVERSITY OF JERUSALEM

The Biology Teaching Program of the Silberman Institute of Life Sciences

Self Evaluation Report for year 2008

Written by

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December 2008

Introduction

Herein we present our report on the biology-teaching program which is the largest teaching program of the Hebrew University of Jerusalem. At any given time about 800 undergraduate and graduate students study in this program which is taught by 63 full time senior faculty, 120 part time junior academic staff and dozens of faculty from the medical school. This immense effort is supported by 50 technical and 15 administrative staff members.

This report was prepared during 2008, a year that has been severely damaged by the prolonged lecturer strike that followed the student strike of the previous year (2007). The stifling budget cuts imposed by the government and the extensive retirement of staff at all levels contributed to the hard time for teaching during these years.

In this introduction we would like to briefly summarize our major findings and conclusions, highlighting the strengths of our institute and program, as well as problems that need attention.

We are offering a rich and flexible program strengthened by our alliance with the medical school on the one hand, and by our location on the science campus on the other hand. The involvement of our top undergraduates in research from their early steps in the academic world, prepares them for a scientific career. In addition to our basic biology program we offer a wide variety of teaching programs: computational biology, psychobiology, chemistry+biology, physics+biology, environmental science and special programs for outstanding students.

Our institute has many excellent scientists of international standing. Almost all the research laboratories are funded by external, highly competitive grants and publish in high impact factor journals. This high quality of scientific achievements is mainly the product of MSc and PhD students work and is a testimony both to their excellence and to the mentorship they receive.

The most important finding that our self-evaluation process has highlighted is the impressive contribution of our program to the scientific community in Israel. As many as 50% of our PhD graduates that have completed their postdoctoral training hold an academic position in an Israeli university, college, or research institute, 14% hold such posts abroad and many of the rest hold senior positions in the biotech industry and in the public sectors.

The next important observation highlighted herein is that most of our MSc students continue their studies toward a PhD degree, usually at our university or at the Weizmann institute. The majority of these graduate students did their undergraduate studies in our program.

Each year we accept 150 - 200 new undergraduate students and a somewhat smaller number graduates from our program. From this group about 20% will proceed to graduate studies. In spite of their subsequent success we feel that our curriculum could prepare them much better for a research oriented career. They require more lab courses, personal tutoring and training in skills of oral and written communication.

With the current financial resources it is unrealistic to provide all our students with this training. Moreover, many of them would neither be suited for such training nor benefit

from it. We therefore propose to split our program into a research-oriented program and a program of more college like education. The Etgar program initiated many years ago had some of the aspects of this new suggestion. It has however been watered down, mainly due to budget reasons, and is no longer very different from the regular program.

We do suffer from some serious problems most of them are the result of the suffocating budgetary situation. This is manifested by the fact that in most recent years, (the last two ones were welcome exceptions), we did not recruit enough new faculty. Our institute lost 25% of its faculty in the last two decades from more then 80 in the eighties to about sixty now. Moreover we fail to attract some of the candidates we want most and lose them to other institutes. This in not always due to direct budget problems, but rather to the ongoing erosion in our standing, infrastructure and environment we can offer. For these reasons certain disciplines of modern biology are missing from our institute and program. Systems biology has never been established, whereas Plant sciences, once one of our flagships, has been drastically reduced. Zoology as a discipline no longer exists in our institute and is no longer part of our curriculum.

The second most serious problem is the 50% cut in technical support for our research laboratories. Competent technicians are the backbone of "wet research", they provide training to new students, maintain the lab, care for its safety and create a productive lab environment. They also play a crucial role in preparing and developing teaching laboratory courses. The reduction of this staff causes severe damage to research and teaching with immediate and long-term effects. We would like therefore to request to reverse this cut, to return the technical positions that have been cut in recent years and to enable us to recruit new technicians to replace the ones that retire.

Referring to the fine results of the success of our graduates it is important to stress that they are a testimony to our past excellence. We find it difficult to maintain this excellence in view of reduced technical support, severe erosion of our infrastructure and decreased numbers of teaching assistants and available lab courses.

We support our teaching by our e-portal that contains much of the information students require for each course. We are developing computerized interactive tutorials for problem-oriented education, self learning and even lab training. Nevertheless employment of such teaching aids can by no means replace personal tutoring or actual lab experience. We currently have only a part-time position to maintain and develop this important portal. This is insufficient and we require at least one full-time position to develop many more programs to enhance our curriculum.

Preparation of a report of such a program was far from trivial and we lacked the expertise, experience and tools to undertake such a mammoth task in a short time and without external help. To collect the vast amounts of data required for this report we made use of two major tools. The first is a continuously updated database of all our courses and all relevant data termed big brother. This database was initiated five years ago by Prof. Ioav Cabantchik, the former head of the teaching program. The second tool we prepared from scratch with the help of central computing. This tool is an online questionnaire for faculty members where they had to fill out all their personal data – grants, publications, students etc. These data could then be analyzed and presented in a rational manner and used for presenting in this report. We hope that this questionnaire prepared and perfected by the dedication of Rachel Novarski from the Authority for Computation Communication and Information will serve in future surveys and evaluation reports in the university.

We are immensely grateful to the people who were the real driving force behind this report: Nurit Doron, our computing wizard and caring mother of teachline that was responsible as a liaison with the central computing facility and on the extraction of the data first from the senior staff and then from Excel; Daniela Ashur, the administrative manager of the institute who told us all what to do and took care that we did it properly and on time; Pnina Banay who manages the teaching secretariat and was responsible for obtaining all the data about the courses;p Nelia Segal and Ruth Mualem for data mining, and finally Ruth Lischinski, for invaluable help with all parts of this report. All these worked on the report in parallel to their regular pressing duties in keeping our institute and teaching afloat.

Special thanks go also to Prof. Jay Feinberg who prepared the self-evaluation report of the physics program two years ago. He made this report available to us helping us immensely in preparing ours.

We are painfully aware of the fact that many reports, prepared with great investment of effort, are archived and have little effect. We do however hope that some of the ideas we present here will be discussed by the committee and will serve as agents of change and improvement of our program. We also hope that some of our more serious plights will be addressed so that we can maintain and expand our scientific and educational excellence.

Finally, we would like to dedicate this report to Prof. Ioav Cabantchik who led our institute in the last two years, some of the most dynamic and fruitful in living history. Under his leadership, which united the institute and enabled extensive recruitments, it seems that we are now on a promising way to a better future.

Prof. Michael Brandeis
Head of Biology Teaching Program

Prof. Isaiah T. Arkin
Chair of the Silberman Institute of Life Sciences

Prof. Yosef Yarom
Former Chair of the Silberman Institute of Life Sciences

December 2008

1. The Institution

1.1 A brief summary (up to one page) describing the institution and its development since its establishment, including details of the campus(es) where the institution's teaching activities take place (number and location), the faculties in the institution, the over-all number of students studying towards academic degrees in the institution according to degree (first degree, second degree with thesis, second degree without thesis, doctoral degree), the date of recognition by the Council for Higher Education.

The proposal to establish a Jewish institution for higher education was raised as far back as 1882, yet the cornerstone of the Hebrew University was only laid in Jerusalem in 1918. On April 1, 1925, the university was officially opened on Mount Scopus. The academic life of the university (courses and research) took place on Mount Scopus until 1948, the year of the establishment of the State of Israel. During the War of Independence, the road to Mount Scopus was blocked and the university was forced into exile; it continued its activities thereafter in rented facilities scattered throughout various parts of Jerusalem. In 1955, the government of Israel allocated land in the Givat Ram neighborhood for a new Hebrew University campus. In 1967, the road to Mount Scopus was reopened, and in the early 1970s, academic activities were restored on the Mount Scopus campus.

The Hebrew University in Jerusalem was accredited as an institution of higher education by the President of Israel, Mr. Yitzhak Ben-Zvi, in accordance with the Law of the Council of Higher Education, 1958, on the 23rd of August 1962.

The Hebrew University operates on five campuses:

- Mount Scopus campus, site of the Faculty of Humanities and the School of Education, the Faculty of Social Sciences, the School of Business Administration, the Faculty of Law and the Institute of Criminology, the School of Occupational Therapy, the School of Social Work, the Truman Institute for the Advancement of Peace, the Center for Pre-Academic Studies, the Rothberg International School, and the Buber Center for Adult Education.

- Edmund Safra campus in Givat Ram, site of the Faculty of Mathematics and Natural Sciences, School of Engineering and Computer Sciences, The Center for the Study of Rationality, The Institute for Advanced Studies, and the Jewish National and University Library.

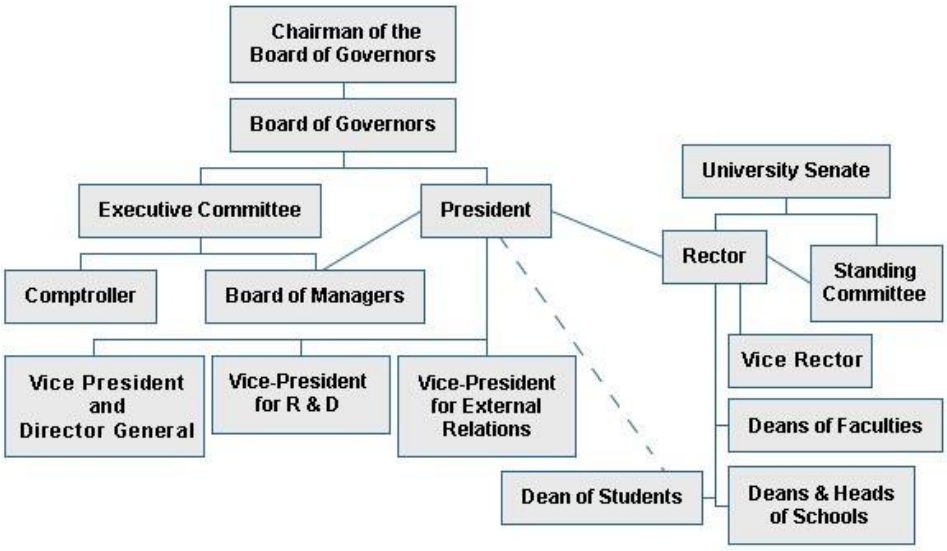
- Ein Kerem campus, site of the Faculty of Medicine (The Hebrew University–Hadassah Medical School, School of Public Health and Community Medicine, School of Pharmacy, and the School of Nursing) and the Faculty of Dental Medicine.

- Rehovot campus, site of the Faculty of Agricultural, Food and Environmental Quality Sciences and the School of Nutritional and Home Sciences.

- Beit Dagan campus, site of the Koret School of Veterinary Medicine.

- An additional site is the Inter-university Institute for Marine Science in Eilat, operated by the Hebrew University for the benefit of all institutions of higher learning in Israel.

1.2 Flow chart of the University's Organizational Structure



Chapter 2 - The Parent Unit Operating the Study Programs Under Evaluation

In this chapter, please relate to the broader organizational framework in which the evaluated study program operates. If there is no such framework, please note it. Then answer paragraph 2.5 and 2.6 (only), and then move on to chapter 3.

Chapter 2 - The Faculty of Science

2.1 The name of the parent unit and a brief summary of its "history", its activities and development in the period of its existence.

The Faculty of Science: The first Dean of the Faculty of Mathematics, Prof. Abraham Halevi Fraenkel, joined the university in 1929, four years after the foundation of the Hebrew University. In the two following years the Microbiology, Chemistry and Physics departments were established and later were joined together to form the Faculty of Science. The War of Independence in 1948 left the University campus cut off from Israeli west Jerusalem, and alternative facilities were located throughout the city. In 1953, construction began on a new main campus at Givat Ram in the heart of Jerusalem. During the Sixties and Seventies the research and teaching activities were all transferred to the Givat Ram Edmond J. Safra Campus.

2.2 **Mission Statement of the Institute, its Aims and Goals**: There are two major missions of the Faculty of Science and Mathematics, as follows:

Learning, Teaching and Educating – The Faculty of Science attracts some of the best students in Israel. The Faculty's aim is to offer them a high level of teaching and training at both the undergraduate and graduate levels, which is based on front-of-the-line academic and scientific expertise and advanced research facilities, aiming at generating highly professional graduates, prepared to cope with any future scientific and professional challenges.

Research – The level of research carried out in the Faculty of Science is one of the highest in the world. In their work, spanning many varied disciplines, our scientists and research students contribute to the store of knowledge worldwide. The Faculty's aim is to maintain top class scientific research in all of its varied disciplines by providing its faculty members, both junior and senior, with advanced facilities and means and by monitoring strictly their academic achievement record.

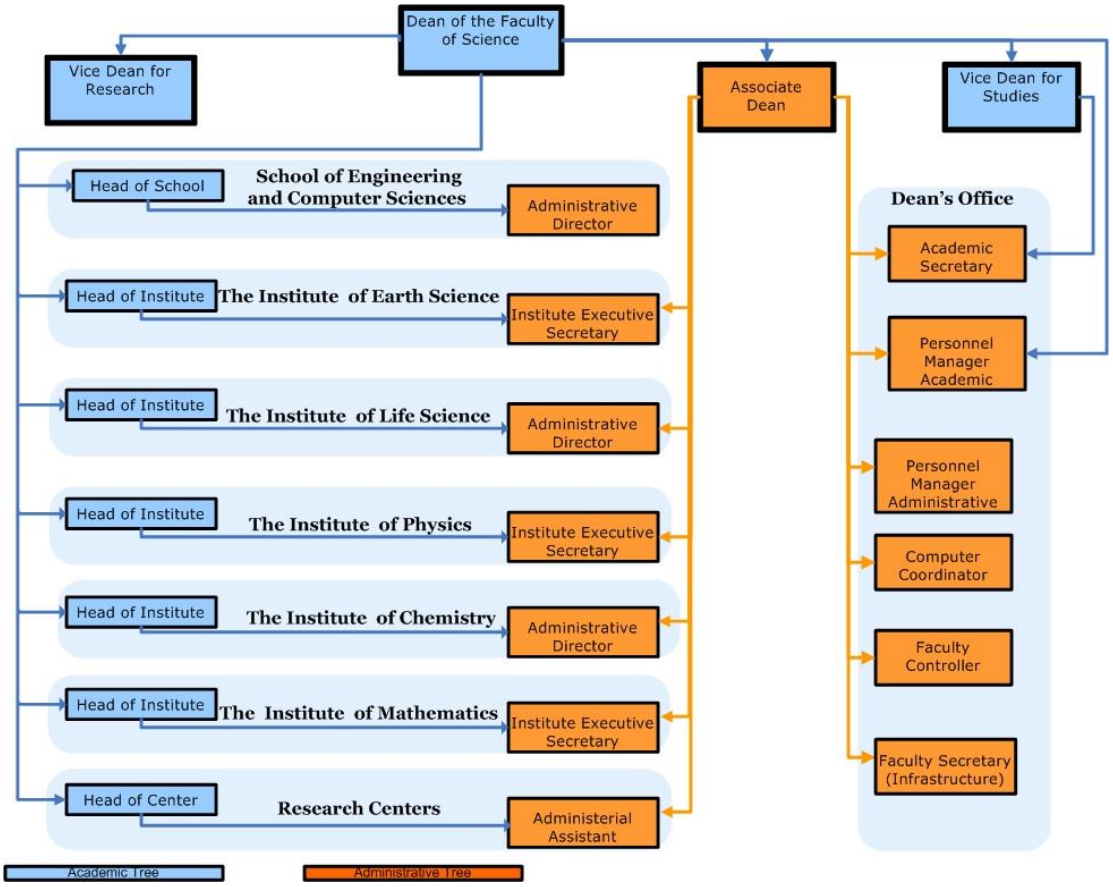
2.3 **Description** and chart of the unit's academic and administrative organizational structure (including relevant committees).

The Faculty of Science consists of five research institutes: *Mathematics, Physics, Life Sciences, Chemistry* and *Earth Sciences*, as well as *"The School of Engineering and Computer Science"*. All these different disciplines are located in the Givat Ram Edmond J. Safra Campus in Jerusalem, in close proximity, which enables bridging various scientific and technological fields and creating new research directions. The combination of these different, basic fields is expressed in the development of multidisciplinary teaching and research centers such as: *The Amos de-Shalit Science Teaching Center*, *The Interdisciplinary Center for Neural Computation*, *The Center for the Study of Rationality*, *The Institute for Advanced Studies*, *The Center for Nanoscience and Nanotechnology and The Sudarsky Center for Computational*

Biology. The Faculty has 240 members, about 2,000 undergraduates and 1,400 MSc and PhD students.

Many members of the Faculty of Science have been internationally acclaimed, and this renown has brought them copious awards and honors in their specific fields of expertise. A short list of just some of the recent prizes includes: **The Nobel Prize** (Prof. R. Aumann, Game Theory, 2006); **The Israel Prize** (Prof. Y. Bekenstein, Physics, 2005; Prof. Z. Rapaport, Chemistry, 2006); The late Prof. Z. Selinger, (Biology, 2007); **The Wolf Prize** (Prof. A. Levitzki, Life Sciences, 2005; Prof. H. Furstenberg, Mathematics, 2007; **The EMET Prize** (Prof. H. Furstenberg, Mathematics, 2004; Prof. M. Rabin, Computer Science, 2004; The late Prof. Z. Selinger , Biological Chemistry, 2005; Prof. Z. Garfunkel, Geology, 2006; Prof. Batsheva Kerem, Life Sciences, 2008; and Prof. I. Willner, Chemistry, 2008).

The Faculty is headed by the Dean of the Faculty. Two Vice Deans assist the Dean to coordinate the research and teaching activities. The Associate Dean is the Administrative director of the Dean's Office and the Faculty. Each of the Faculty institute is headed by the institute's Chairperson who is assisted by an administrative director. The teaching activities of each institute are coordinated by the Head the Teaching Program who is an ex-officio member of the Faculty Teaching Committee under the Vice Dean.



2.4 **Names of holders of senior positions at the Faculty of Science:**

Dean of Faculty: Prof. Gad Marom

Associate Dean: Dr. Jacob Nissenbaum

Vice-Dean for Studies: Prof. Michael Paul

Vice-Dean for Research: Prof. Yosef Yarom

Assistant to the Dean for Scholarships/Fellowships: Prof. Alan Matthews

2.5 The number of study programs (departments, etc) operating in its framework; the names of the academic degrees (in English and Hebrew) granted to the graduates of these programs (the phrasing that appears in the diploma); the number of students who have studied (and are studying) within the parent unit in each of the last five years according to the level of degree (first degree, second degree with thesis, second degree without thesis, doctoral degree). Please provide this data in the format of a table.

The Faculty of Science hosts **18** departments and programs of study towards the first degree (**Bachelor of Science**) and **23** departments and programs of study towards the second degree (**Master of Science**) and the **PhD** degree. The studies towards the PhD degree are administered within the framework of the Authority for Research Students.
The Faculty of Science confers the following degrees; the list of Departments and Programs of Study in which the degrees are conferred is given in Table 2.6b.

- **Bachelor of Science**

Upon successful completion of the required course of studies in the Department(s) of …

בוגר אוניברסיטה במדעי הטבע BSc לאחר שסיים את מסכת הלימודים בחוג ... או בתוכנית משולבת בחוגים ...

- **Bachelor of Science**

Upon successful completion of the required course of studies in the Department(s) of …

With Specialization in ...

בוגר אוניברסיטה הטבעבמדעי BSc לאחר שסיים את מסכת הלימודים בחוג ... בהתמחות ...

- **Master of Science** upon completing the required course of studies and submitting the prescribed thesis in the Department of …

מוסמך אוניברסיטה במדעי הטבע MSc לאחר שסיים את מסכת הלימודים וחיבר עבודת גמר בחוג ...

- **Master of Science** upon completing the required course of studies and submitting the prescribed thesis in the Department of … with Specialization in …

מוסמך אוניברסיטה במדעי הטבע MSc לאחר שסיים את מסכת הלימודים וחיבר עבודת גמר בחוג ... בהתמחות ...

- **Master of Science** in the frame of direct studies to PhD in the Department of …

מוסמך אוניברסיטה במדעי הטבע MSc במסגרת המסלול הישיר לדוקטורט בחוג ...

- **Master of Science** upon completing the required course of studies in the Department of …

מוסמך אוניברסיטה במדעי הטבע MSc לאחר שסיים את מסכת הלימודים בחוג ...

2.6 The number of graduates of the unit in each of the last five years according the level of degree (first degree, second degree with thesis, second degree without thesis, doctoral degree). Please provide this data in the format of a table.

Table 2.6a Number of students in the Faculty of Science

Academic Year	BSc	MSc with thesis	MSc without thesis	PhD
2003-04	2006	664	42	558
2004-05	1867	698	41	590
2005-06	1903	668	53	633
2006-07	1997	640	74	667
2007-08	2033	646	75	679

Table 2.6b: List of Departments and Programs of Study

Mathematics	מתמטיקה	BSc	MSc	PhD
Physics	פיסיקה	BSc	MSc	PhD
Chemistry	כימיה	BSc	MSc	PhD
Life Sciences	מדעי החיים	BSc		
Computer Sciences	מדעי המחשב	BSc	MSc	PhD
Earth Sciences	מדעי כדור הארץ	BSc		
Environmental science	מדעי הסביבה	BSc	MSc	PhD
Mathematics and Math Teaching	מתמטיקה במגמת הוראה	BSc		
Computer Sciences and Computational Biology	מדעי המחשב וביולוגיה חשובית	BSc	MSc	PhD
Computer Engineering	מדעי המחשב	BSc		
Computer Engineering with Specialization in Applied Physics	מדעי המחשב בהתמחות פיסיקה יישומית	BSc		
Applied Physics	פיסיקה יישומית			PhD
Brain Sciences: Computation and Information Processing	מדעי המח: חישוב ועיבוד מידע		MSc	PhD
Specialization in Rationality	התמחות ברציונליות		MSc	PhD
Amirim: Program for Outstanding Students	אמירים: תוכנית מצטיינים	BSc		
Talpiot:: IDF Academic Program in Physics and Mathematics	תלפיות: תוכנית אקדמית צה"לית בפיסיקה-מתמטיקה	BSc		
Plant Sciences (Botanics)	מדעי הצמח (בוטניקה)		MSc	PhD
Cellular and Developmental Biology	ביולוגיה תאית והתפתחותית		MSc	PhD
Genetics	גנטיקה		MSc	PhD
Brain and Behavioral Sciences	מדעי המח וההתנהגות		MSc	PhD
Structural and Molecular Biochemistry	ביוכימיה מבנית ומולקולרית		MSc	PhD
Evolution, Systematics and Ecology	אבולוציה, סיסטמטיקה ואקולוגיה		MSc	PhD
Specialization in Genomics and Bioinformatics	התמחות בגנומיקה		MSc	PhD
Biotechnology	ביוטכנולוגיה		MSc	
Bioengineering	ביו-הנדסה			PhD
Exact Sciences (Physics-Chemistry)	מדעים מדויקים (פיסיקה-כימיה)	BSc	MSc	PhD
Chemistry and Life Sciences	כימיה-ביולוגיה	BSc		
Geology	גיאולוגיה	BSc	MSc	PhD
Atmospheric Sciences	מדעי האטמוספירה	BSc	MSc	PhD
Climate, Atmosphere and Oceanography	אקלים, אטמוספירה ואוקאנוגרפיה	BSc		
Science Instruction	הוראת המדעים		MSc	PhD
Oceanography	אוקיאנוגרפיה		MSc	PhD
Management of Technology	נהול טכנולוגיה		MSc	.

The number of graduates of the unit in each of the last five years according the level of degree (first degree, second degree with thesis, second degree without thesis, doctoral degree). Please provide this data in the format of a table.

Table 2.6c Number of graduates of the Faculty of Science

Academic Year	BSc	MSc with thesis	MSc in direct studies to PhD	MSc without thesis	PhD
2003-04	574	162			83
2004-05	611	131	24	15	99
2005-06	552	183		35	73
2006-07	480	145	22	10	67
2007-08	473	154	26	17	82

2.7 What bodies (internal/external) decide on rationale, mission and goals of the parent unit and of the study programs, how they are decided upon, examined and, if deemed necessary, changed? Have they been discussed within the last five years? If so, please specify when these discussions have taken place and what were their outcomes? If not, when were changes made (if at all)? How are the mission, goals and changes brought to the attention of the teaching staff, the students and the institution's authorities?

The body academically responsible for the teaching program is the teaching committee of the faculty of sciences. This committee is composed of the heads of all the teaching programs of the faculty as well as representatives of the students and the senior staff. This committee is headed by the vice dean for teaching and convenes, in the presence of the dean several times a year. This committee discusses changes in the various teaching program, addition of new, mainly combined, programs and various academic issues. Some of its decisions must be ratified by authorities of the University. New programs must further be ratified by the council for higher education. Some of the issues discussed are relevant for several of all teaching programs.
The most recent topic relevant to the biology program discussed in committee was the physics-biology combination that was presented and confirmed two years ago. All other programs were discussed more then five years ago. The committee lacks the expertise of addressing in depth internal issues of the biology teaching program (or any other program). These issues are dealt with the teaching committee of the teaching program (see below) and the various disciplines of the program.

Chapter 3 - The Evaluated Study Program

Note: In this chapter we require separate reference to each of the study programs under examination at each of the levels taught (first, second, doctoral degree). The identical data for all the programs will appear only once. Finally, use of gender-exclusive language throughout the report is only a matter of convenience and is not meant to imply any sexual bias.

3.1. The Goals and Structure of the Study Program

3.1.1. The name of the study program, a brief summary describing its development since its establishment.

The Life Science (LS) Teaching Program at the Hebrew University of Jerusalem

Research and teaching in biology date to the very early days of the Hebrew University. Already at the time of the laying of the University Foundation Stone in 1918, three research institutes were founded, among them the Institute of Microbiology (the other two were the Institutes of Chemistry and Judaic Studies). In 1925, the year at which the official opening ceremony of the University took place, two new appointees - Prof. Alexander Eig and Prof. Frederick Simon Bodenheimer - established the Departments of Botany and of Zoology. Research and teaching in today's Institute of Life Sciences are a direct continuation of the scientific traditions established in those early days.

Following the Israeli War of Independence, the 1949 armistice agreement with Jordan has left the Hebrew University campus on Mount Scopus as an Israeli-held enclave in Jordanian territory. Since routine activities could not be held there, teaching and research activities were conducted in numerous sites in Jerusalem. The Biochemistry, Genetics and Zoology Departments, for example, were each located in a different part of the city. During the 1950's many of the university activities regrouped in the newly built Givat Ram Campus, but only many years later did these include the aforementioned biological departments. In 1963, the Faculty of Mathematics and Natural Sciences was reorganized in five Institutes – Mathematics, Chemistry, Physics, Biology and Earth Sciences. This decision has led to the unification of the different life sciences departments under one roof; this roof was initially virtual, but in 1968 construction has started on a central biology building in Givat Ram. During the seventies many of the departments were brought in from all over the city, and in 1976 the building was named after Alexander Silberman, founder of the Penn Corporation in Philadelphia, who established a Foundation for Applied Science Research at the Hebrew University.

3.1.2. Mission statement of the study program, its aims and goals

Undergraduate program

The goal of the undergraduate program in Life Science is to endow the future generation of graduates with the knowledge and tools of modern biology. Our graduates should be ready to continue, via higher education, basic and applied research in all fields of life sciences. They should also be prepared to take part in high school education, or participate in the biotech and pharmaceutical industries.

Providing fundamental and balanced education in modern biology within three years of undergraduate studies is a complex task. On the one hand it requires

basic knowledge in natural sciences like chemistry, physics and mathematics and on the other hand, each of the subfields of biology like cell biology, system biology, environmental biology or population biology are independent disciplines by themselves. To achieve this goal we provide compulsory introductory courses in natural sciences and in basic biological disciplines like molecular, cellular, organism, population and ecosystem biology. With this primary knowledge the students can then choose to focus on three to five subfields of biology. This is achieved by offering a large number of optional advanced courses covering most fields of modern biology. These courses provide our graduates with a basic education in laboratory work as well as the tools to read and understand the scientific literature, to understand, conceive and plan scientific experiments and to express themselves orally and in writing.

We strive to identify our most talented students and promote them by providing them with the opportunity to engage in research in the laboratories of the Life Science Institute.

Graduate program
Our graduate program is divided into an MSc program and a PhD program as well as a combined direct PhD program. Students are allowed to switch from the MSc program to direct PhD program depending on their achievements.

The core of the MSc program is an original research work under the supervision of a faculty member. Students may choose an MSc program from a selection of six disciplines that aim to provide our students with a thorough knowledge of cutting edge research in the relevant field. Each discipline provides numerous advanced theoretical and practical courses that train the students in modern research methods and approaches.

The aim of our PhD program is to train capable individuals to perform independent, high quality research, to develop self-criticism and original thinking, while adhering to ethical values of science. This program should prepare them for an independent scientific career.

We consider teaching competence of major importance for our graduates. Our top graduate students, both of the MSc and PhD programs have the opportunity to experience teaching in practical laboratory courses as well as instructors of topics in specific courses. We try to involve as many students in teaching but are however limited by the number of TA positions that are funded by the university.

3.1.3. Description and chart of the academic and administrative organizational structure of the study program (including relevant committees)

The teaching at the Hebrew University is headed hierarchically by the Rector, the vice-dean for teaching of the faculty of sciences and the head of the life sciences teaching program. The vice dean is assisted by the faculty teaching committee which consists of the heads of the various teaching programs of the faculty as well as representatives of the students and the lecturers.

The head of the life sciences teaching program is assisted by the teaching committee that consists of the heads of the different teaching disciplines

(Chugim). The head of the teaching program is officially responsible for the entire program. The heads of the disciplines are, however, in charge of assigning the senior and junior teaching staff to appropriate courses. They are further in charge of supervising the individual curriculum of MSc students. The teaching program has one senior secretary and several secretaries that each serve one or more disciplines.

3.1.4. Names of holders of senior academic and administrative positions.

Academic

Prof. Isaiah Arkin – Chair of the Silberman Life Sciences Institute
Prof. Michael Brandeis - Head of Biology Teaching Program

Teaching Committee (2008-9)
Prof. Ronen Kadmon –ESE (Ecology, Systematics and Ecology)
Prof. Oded Livna – Biochemistry
Prof. Ariel Darvasi – Genetics
Prof. Aharon Oren – Plant science
Dr. Adi Mizrachi – Neurobiology
Dr. Benjamin Aroeti – Cell Biology

Administrative

Mrs. Daniela Ashur – Administrative director of the Silberman Institute of Life Sciences
Mrs. Pnina Banay – Head of the teaching secretariate of the teaching program
Mrs. Ruth Lischinski – Secretary of the Chair of the Silberman Life Sciences Institute
Mrs. Nurit Doron – Responsible of the e-learning of the teaching program

3.2 The Study Program – Contents, Structure and Scope

3.2.1 The name of the study program, specializations/tracks within the program, the campus where it is taught (if the institution operates on a number of campuses), date of opening the program. If the study program is offered on more than one campus, is the level of the program uniform on different campuses, and what measures are taken in order to ensure this?

In addition to the "main stream" of biology teaching that takes in over 120 students per year, we offer several teaching programs that are joint endeavors with other institutions within and outside the Science Faculty. These are summarized in table 3.2.1a.

Table 3.2.1a – The different teaching programs

Program	# of students	Participating Institutes	points required	Date of Opening
Biology Major	>120	LS	144	1925
Etgar (Challenge)	20	LS	144	1990
Biology dual Major		LS + any other program	60 biology + 30 basic science + requirements of other program	1925
Psychobiology	30	LS+ Psychology	150	2005
Chemistry and Biology	40	LS+ Chemistry	148	2004
Computational biology	25	LS+ Comp	159	1999

Etgar (Challenge) – A program aimed at the top students of biology, enriching their education by tutorial-like supervision provided by a group of faculty members representing the different disciplines.
Psychobiology – A joint program between the LS and the Dept of Psychology. This special program combines studies in psychology and biology. In addition to the battery of courses from the regular biology and psychology teaching programs, it includes four specially designed courses that tightly combine the two disciplines (Brain and behavior for psychobiology courses, BSc seminar, Supervised research in psychobiology and a lab course given at the IUI in Eilat).
Chemistry-Biology – A combined program of both fields with program heads from both institutes. This highly popular program enables students to combine both disciplines by coordinating the programs despite their very demanding curriculum. This program has no special courses of its own.
Computational Biology (**Bioinformatics)** – A separate direct MSc track program (with an optional BSc exit stage), with its own head, for students who wish to combine both disciplines. This program is composed of courses from both disciplines with no special courses (except seminars and guided project) restricted to these students.

3.2.2 The study program and the specializations it offers, its content, scope and structure (years of study, semesters, hours per year and credits) and the distribution of the studies throughout the academic year. Please submit this information in Table 6.1. Does the study program supply courses to other units within the institution?

Undergraduate Program
To receive a BSc degree majoring in biology a student has to complete six semesters of studies of about 24 hours per week. One weekly lecture during a semester is considered as a "credit point" and a student has to complete 144 credit points. The requirements for the different other combinations can be found in table 6.1 and in more depth on the site of the faculty of science http://science.huji.ac.il/cdshnaton/maslulim.html.

The program is subdivided into six different parts (Table 6.1):
1. Basic science courses that are supposed to give our students a fundamental education, essential and directly relevant to their biology studies. This includes physics (mechanics and electricity), calculus, statistics, chemistry (general, organic, physical and lab course), as well as basic programming (Java and Matlab).

A. The chemistry and physics courses are provided by corresponding institutes of our faculty and are under their academic and administrative responsibility. Their syllabi however are coordinated with biologists to accommodate for the biological students' needs. These courses consist of frontal lectures and are strongly supported by exercises provided by teaching assistants. One of the courses is a lab course. Regrettably, the other courses do not have a practical / laboratory part, which they used to have in the past.
B. Calculus is a frontal lecture course provided by professional (non faculty) teachers. It is under the supervision of the Institute for Mathematics and is supplemented with exercises provided by teaching assistants.

C. Programming is essentially an exercise-oriented course provided by the programming teaching unit. Until last year students only learned Java. We have now supplemented it with Matlab, which is relevant to many biological applications.
D. Statistics is a frontal lecture course taught by faculty of our institute supported by exercises provided by teaching assistants.

2. Compulsory introductory courses in biology are given during the first three semesters. These courses form the basis of the biological knowledge of our students. The introductory courses include lectures, exercises and experiments (laboratory work), and are given by LS faculty, as well as lecturers from the medical school and LS teaching assistants.

A. First semester
   a. From Cell to Organism – basic biology course with a compulsory lab course (laboratory used to be integral part of the course, is now separate but still obligatory).

B. Second semester
   a. Basic Genetics – lectures, exercises and laboratories.
   b. Biochemistry of the cell – lectures and exercises.

C. Third semester
   a. Molecular biology – lectures and exercises.
   b. Physiology – lectures, exercises and laboratories.
   c. Ecology and population biology –lectures and exercises.
   d. Microbiology - lectures and laboratories.
   e. Plant biology - lectures and laboratories.

3. The advanced-introductory courses are given during the fourth semester and are divided into two groups:

A. Molecular and developmental: genetics, cell biology, biochemistry, microbiology, botany and bioinformatics.
B. Organism and environmental: physiology, neurobiology, evolution and ecology

The students have to choose three courses from the first group and two from the second, so as to get a broad education in the cellular/molecular level as well as in organism/population level. Specialization can always be achieved at later stages of their BSc studies and during their graduate studies.

4. This part of the BSc program is composed of dozens of different courses covering all aspects of modern biology from which student have to chose several courses (amounting to at least 30 credit points). The large selection of courses that we offer is one of our strengths. Here too courses are divided into two groups and students have to participate in a minimal number of courses from each of the groups (at least 9 credit points from each group). These courses include frontal lectures, field trips, laboratories, exercises and seminar courses.

5. BSc Seminar. Every student is required to prepare a seminar that comprises of a 30-40 minute talk that summarizes several research articles. In addition each student has to prepare and submit a one page summary of his seminar. The seminar, which is prepared under the personal guidance of a faculty member, is

presented orally to a group of students and lecturers. Each group is organized by one of the six disciplines of LS (ecology, Systematics & evolution; genetics; biochemistry; cell biology; neurobiology; microbiology and plant sciences).

6. Our biology teaching program allows students to incorporate non LS courses to complete the required quota of 144 credits. These additional courses, may be selected within the faculty of Science as well as from other faculties of the Hebrew University.

Additional programs and combinations

The above description refers only to those students that study biology as their major subject. We also offer a "Dual Major" program, where students can combine biological studies with other subjects, such as physics, chemistry, computer sciences or even humanities and social sciences (see table 6.1). This Dual Major has somewhat less requirements, particularly if the second half of the program contains overlapping issues. This program is based on 60 points of biological studies and 30 points of basic science courses (item 1 above). The 60 biological points are composed of all the courses included in items 2A and 2B (see above). They have to choose three courses listed in item 2C, two courses listed in item 3A and one from 3B. The rest of the points are chosen from the courses mentioned in item 4.

The biological part of the other programs listed in table 6.1 follow roughly along the lines of the double major with some appropriate adjustments. More details can be found in http://science.huji.ac.il/cdshnaton/maslulim.html.

MSc Studies

Our MSc program is under the responsibility of six different disciplines: **ESE** (Ecology, Systematics and Evolution), **Genetics, Biochemistry, Cell biology, Neurobiology** and **Plant sciences**. Students who have completed undergraduate studies in any of the teaching programs with a weighted grade average of at least 80-85 (depending on the specific program) are accepted for MSc studies. Students from other academic institutes or student from other natural sciences programs are accepted only after undertaking additional courses of about 15-20 points from the undergraduate courses. These courses that are needed to complete the students biological education and have to be approved by the representative of the corresponding discipline. There are two parts to the studies toward MSc degrees that normally last 2 years. The research part is performed under the supervision of one of the LS faculty members and it is summarized in a written MSc thesis. The second part consist of courses amounting to 30 credit points that need to be fulfilled, of which at least 15 points have to selected from courses offered by the LS faculty.

PhD Studies

Studying toward a PhD degree is administered by the "Authority for Research Students". The LS contributes the research facilities, the research expertise of its faculty members and the courses. The requirements to enter the program as well as the student's progress are monitored by the Authority for Research Students. A candidate for a PhD degree must have completed his undergraduate studies at a recognized university and hold a Master Degree including a research thesis. Students without biological education need to complete their biological background by completing successfully undergraduate courses offered by the LS and approved by the representative of the corresponding sub-discipline. Each PhD

student is required to take 12 credits from the graduate courses offered by the LS and approved by the Authority for Research Students. A “thesis advisory committee” is appointed by the Authority for Research Students for each PhD student. Its task is to monitor the progress of the student's research work and to advise the student, should the need arise.

3.2.3 To what extent do the structure, scope and contents properly reflect the main goals of the study program?

The goal of the undergraduate program is to provide the students with the basic knowledge of modern biology that is essential for graduate studies, the biotechnological industry as well as for high school teaching. Facing the enormous amount of knowledge accumulated during recent decades, it is rather difficult to provide ***all*** this knowledge to ***all*** the students. The current teaching program reflects a compromise where we defined the essentials that appear in the program as compulsory courses, and enhance it with a huge collection of optional courses that cover all the subfields of biology explored at the LS. Some of the missing subfields are supplemented by faculty members from the medical school or external teachers. To prevent the students from chosing to take all the optional courses from only one discipline, we classified the courses into two categories (molecular and cellular versus organism and environment) and oblige the students to choose from both categories.

3.2.4 Specify what bodies are responsible for the planning and managing of the study program. What are the mechanisms responsible for introducing changes and updating the study program, and how do they operate. If fundamental changes have been introduced into the study program during the last five years, please specify what they are.

The head of biology teaching program (Prof. M. Brandeis) and the biology teaching secretariat carry the main load of running the program. This team takes care of the entire administrative chores regarding Faculty and TA assignments; examinations at the end of the courses; organizing the students in small groups for laboratory courses or exercise; updating the annual catalogue and the courses syllabi etc.

The LS teaching committee, which is composed of representatives of each of the six disciplines in LS, is in charge of the merit of the program. Any substantial change in the teaching program has to be approved by this committee. One of the main roles of the LS teaching committee is to select the TAs from the overwhelming number of candidates.

The teaching program is frequently reevaluated both at the level of the discipline and the level of the entire program. This essential procedure is needed to ensure up-dating of teaching issues and accommodating for this fast growing field. The former head of the teaching program was worried that students are focusing into their fields of interest too early in their studies. He therefore imposed a rigid program with several groups of courses from which students had to choose. This is indeed an important issue, however it extremely restricted the choice the students had. It also dramatically reduced the number of students in some of the high level courses. We have therefore changed the program yet again, enabling a wide spectrum of elective courses. They were divided into two groups (molecular

and cellular versus organism and environment) so that students still have to take courses from different fields but with a very wide choice.

3.2.5 Describe the mechanism for coordinating and examining the contents that are, in fact, being taught, if such a mechanism exists.

The head of the teaching program and heads of the different disciplines scrutinize all the syllabi of the various courses in order to minimize redundancy and overlap.

3.2.6 In summary, to what extent has the program achieved its mission and goals? What are its strengths and weakness?

As mentioned above the goal of the undergraduate program is to provide the students with the basic knowledge of modern biology that is essential for graduate studies, biological industry, as well as high school teaching. Indeed, we are confident that we achieved this goal. Top students that completed their BSc degree at our institute are welcomed in advanced program in academic institutes in Israel or abroad. Our former PhD students hold academic positions in all Israeli institutions of higher education as well as abroad (see 3.4.8). In fact our former students constitute a significant proportion of the LS scientific community in Israel. We perceive these findings as an indication of the success of our teaching program. However, we genuinely feel that our wide selection of courses is still not enough to cover all aspects of modern LSs. Furthermore, the continuous erosion in our selection of practical courses (lab courses) brought us to the absolute minimum. Any further reduction in this type of courses will have a devastating effect on the quality of our teaching.

3.2.7 Are additional non-academic bodies involved in the running and the activities of the parent unit and study program? If so, what are these bodies and what is the mutual relationship between them and the leadership of the parent unit (for instance, the mutual relationship between Business School and Manufacturers' Association or Industrial Factories)?

No such bodies are involved in running the activity of the program.

3.2.8 What are the future development plans of the evaluated study program, and how were they decided upon?

As stated above, the teaching program in its current form is a compromised solution that provides students with the basic knowledge of modern biology and offers a large selection of courses, from which the students choose their topics of interests. Despite the flexibility of the program, it still ensures a relatively broad education.

The program is, however, severely limited in providing hands-on experimenting or personal tutoring. The latter have a direct impact on the ability of the students to express themselves either in writing or lecturing. These drawbacks, which are mainly due to financial limitations, can, and should be rectified.

The preparation of this report triggered a discussion among its authors on possible remedies to these shortcomings. The authors conceived the revolutionary solution outlined below. By constructing two or three different programs, each with its own goal, one can provide a reasonable solution within the current budget boundaries. Most of the resources will be allocated toward the program that aims to educate the next generation of scientists. This pre-selected group that comprises the top 10-20% of the students will have an increased amount of practical courses, as well as prolonged sessions of personal tutoring. In fact students in this program will be taught ***how to learn and how to investigate.***

The second program will be focused on training personnel for the biological industry. This fast growing industry is searching for high quality personnel that can perform independently along production lines. Accordingly this teaching program will focus on methodology and therefore an increase in number of practical courses will be needed.

Finally, there is a large group of students that are not suitable or interested in research career and could benefit from a college type education. Accordingly, the third teaching program will be mostly based on frontal lectures that can accommodate a large number of students without a need for increased budget.

In short, the three proposed teaching programs will provide high level, up-to-date biological education, each with its own “flavor”. The research-orientated program will have an enhanced practical and tutorial teaching, methodology will highlight the second program and enriched frontal lectures courses will hallmark the third program. It must be stressed however that this idea still requires thorough discussions, detailed preparations and approval and is thus a long term proposal.

3.3. Teaching and Learning

3.3.1. Specify what teaching and learning methods are applied in the program: frontal lectures, self-study, distance learning, laboratories, seminars and pro-seminars, practical training, group exercises, role playing and simulations, organized tours, conferences and other methods. To what extent are these methods applied (% of the overall number of teaching hours, % of the overall number of credits).

Traditionally studies in the university are based on frontal lectures. This is true throughout undergraduate and graduate courses. Almost all of the basic and advanced-introductory courses are supplemented by group exercises, laboratories or both (see table 6.1 for details). The majority of the elective advanced courses are lecture courses, and many of them include seminars. Several courses on fauna and flora are based on field trips. The number of these courses is small due to shortage of teaching staff in these fields.

For budgetary reasons and cuts in manpower, the percentage of laboratories and field trips in the curriculum has been significantly reduced during the past two decades. For instance, the compulsory biochemistry laboratory course was cancelled twenty years ago and is currently offered as an elective course available only to a small number of students. Likewise *Drosophila* mating experiments in the introductory genetics course and the labs in introduction to ecology have been cancelled.

In an attempt to provide our students with some lab experience in spite of the prolonged and severe budget reductions, we have developed during the last decade a number of on-line interactive tutorials (http://teachline.ls.huji.ac.il/virtual_lab.html). These tutorials simulate a set of experiments aimed at addressing different scientific questions. The students are required to analyze results obtained by different techniques and design new experiments based on these results using proper control systems. Some of these tutorials supplement introductory courses serving more than a hundred students each year. Additional tutorials support advanced courses and focus on expensive up-to-date techniques.

Self-study is relatively restricted compared with the situation in the US or UK universities, and compared with what we find desirable.

Practice-assignment. In most basic and advanced-introductory courses the students are required to submit practice-assignments on a weekly basis. Feedback is given on an individual or small group basis. A couple of these courses make use of the "CAPA" computerized self-learning platform, which provides immediate feedback to students in both conceptual and numerical problems. Part of the previously mentioned on-line interactive tutorials (virtual labs), are practiced by students at home, and problems are then discussed in class.

Reading assignments. In basic and advanced-introductory courses students are requested to read chapters from textbooks but rarely do so. In advanced courses

students have to read selected papers for class discussions or oral presentations and do so successfully.

Every undergraduate and graduate student is required to present a seminar (BSc and MSc seminars). These are prepared individually under faculty supervision.

Supervised research is a special course offered to the top undergraduate students. Students join a lab of a member of our institute and do research like graduate students, enabling them to experience all aspects of research. They have to present a seminar about their work and submit a written paper. This popular course also helps the students to choose a lab for their graduate studies and helps faculty to evaluate prospective MSc applicants.

The interuniversity institute (IUI) of marine science in Eilat offers courses in marine biology open to our students as part of our curriculum. These excellent elective courses are in high demand. They include lab work, lectures and most importantly, work on the reef and at sea.

3.3.2. What steps are taken in order to evaluate teaching and improving teaching? How are the results of these activities used, specifically, the negative findings about staff members' teaching? Does the unit act in order to locate and encourage excellent teachers? Does the unit or the institution offer the teaching staff regular and systematic activity, including courses/in-service training/instruction and guidance programs in order to improve the quality of teaching? Do new staff members receive special support?

Senior staff

The university performs a thorough survey of each course at the end of each semester. Until two years ago this survey was done by distributing forms to the students at the end of each course and the students filled them out in class (see figure 3.3.2a). In the last three years the university switched to an internet-based survey. Students are requested to fill out the questionnaire on-line. Despite the fact that on-line filling of questionnaire should make little difference, it is found that the students have no incentive to filling out these forms, which are taken as a nuisance, especially for courses with multiple lecturers. We feel therefore that much less students fill out these forms and these will probably be mainly those who were particularly happy, or unhappy with the course.

The results of these surveys are given to the lecturers and are also checked by the head of the teaching program. In cases of severe criticism by the students the head of the program meets the teacher in question to discuss the students' remarks and possible means to alleviate the problems. Lecturers who obtain poor results are asked to take part in teaching improvement workshops. Top lecturers are notified and their names are published. Results of surveys are supposed to be posted on the internet as part of the site of the course. This will be implemented in the near future. Teaching surveys play an important role in promotion-committee decisions.

The grades of each course must be approved by the head of teaching program before they are released. In this manner he can identify abnormalities and problems.

The most rapid and efficient feedback system of evaluation of teaching and identification of problems is our informal system of students' complaints. For example two years ago our attention was attracted to the course in physical chemistry due to a large number of complaints, combined with a very high failure rate. We acted promptly to solve the problem by discussing the situation with the teacher of the course. The teacher suggested and implemented several important measures that helped the students to absorb any material that was deemed difficult. The next year the failure rate dropped and the students did not complain anymore.

Figure 3.3.2a – Teaching survey form

המחלקה למינהל תלמידים האוניברסיטה העברית בירושלים מדור מיון והערכה

שאלון הערכת הוראה

סטודנטית יקרה, סטודנט יקר,

האוניברסיטה מבקשת את חוות דעתכם, **בעילום שם**, על המורה ועל הקורס. תשובותיכם יסייעו למורה בתכנון קורסים בעתיד וישמשו כלי חשוב בידי הנהלת האוניברסיטה במאמציה לשפר את טיב ההוראה.

השאלון מיועד להערכה של **מורה אחד בלבד**. הקפידו לציין את שם המורה ושם הקורס במקומות המתאימים. אם בקורס מלמדים מורים אחדים, **כל מורה יוערך בשאלון נפרד**.

שם המורה	שם הקורס

בשאלות 1–10 ההערכה היא בסולם של 20 ציונים: 1– הציון הנמוך ביותר, 20 – הציון הגבוה ביותר. לנוחיותכם, הסולם מחולק לחמש דרגות המוגדרות במילים: מועטה ביותר, מועטה, בינונית, רבה, רבה ביותר. לשאלות 11–13 חמש אפשרויות תשובה, המפורטות לצד השאלות עצמן.

למשומת לב,

מלאו את השאלון **בעט כהה** (שחור, כחול, אדום, ירוק וכדומה). **אין להשתמש בעיפרון**.

סמנו ☒ במשבצת המתאימה בלי לחרוג ממסגרת המשבצת, כך: ☒ (לא כך: ☒ ולא כך: ◯).

למחיקה השחירו את המשבצת: ■.

גוות דעתכם חשובה לנו - אנא מלאו את השאלון בכנות ובכובד ראש.

השאלה	רבה ביותר	רבה	בינונית	מועטה	מועטה ביותר
1. באיזו מידה הקנה לך הקורס ידע וכלים לניתוח ולחשיבה?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
2. באיזו מידה תרמו עבודות הבית ללימודים בקורס?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
3. באיזו מידה עורר הקורס סקרנות אינטלקטואלית?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
4. באיזו מידה הועברו השיעורים בצורה מעניינת?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
5. באיזו מידה לימד/ה המורה בצורה מאורגנת ובהירה?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
6. באיזו מידה היטיב/ה המורה להשיב על שאלות התלמידים/ות?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
7. מהי מידת הזמינות וההיענות של המורה מחוץ לשעות ההוראה?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
8. באיזו מידה היה יחס המורה לתלמידים/ות נאות?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
9. מהי מידת שביעות רצונך **מהקורס** באופן כללי?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1
10. מהי מידת שביעות רצונך **מהמורה** באופן כללי?	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1

11. רמת הקורס הייתה מבחינתך:
- ☐ גבוהה מדי
- ☐ גבוהה
- ☐ מתאימה
- ☐ נמוכה
- ☐ נמוכה מדי

12. קצב הקורס היה מבחינתך:
- ☐ מהיר מדי
- ☐ מהיר
- ☐ מתאים
- ☐ איטי
- ☐ איטי מדי

13. ההישגים שלך בקורס יהיו להערכתך:
- ☐ גבוהים מאוד
- ☐ גבוהים
- ☐ בינוניים
- ☐ נמוכים
- ☐ נמוכים מאוד

Junior teaching staff

Teaching assistants are evaluated in a similar manner. In principle negative results could be used to cancel their annually renewed positions. Our teaching assistants however are excellent and fare generally well in these surveys. During recent years there was never a case where a position was not renewed due to poor performance.

3.3.3. Describe the use of information technology in teaching and learning: methods, scope, types of course etc.

The Alexander Silberman Institute of Life Sciences maintains its own e-learning portal - "Teachline" (*http://teachline.ls.huji.ac.il/*). Currently TeachLine offers over 120 web sites for courses taught in the Institute. Each course site offers course material developed by the Hebrew University staff and further enrichment compiled from all over cyberspace. Course sites may include:

- Lecture Notes.
- Required reading (papers, textbooks & their web companion sites).
- Weekly assignments.
- Lab materials (protocols, results, guidelines for analysis).
- Interactive computer tutorials simulating lab work. (Look at section 3.3.1 for more details).
- Subject related materials with special emphasis on animations, simulations & interactive models of molecules.
- Practice quizzes.
- Useful databases & software related to the course material and in frequent use by the scientific community.
- Additional means to search the web efficiently.

Other than course sites, the TeachLine portal offers additional resources aimed at expanding the availability of on-line interactive teaching aids.

a. A compilation of textbooks' web companion sites developed and supported by different publishers (http://teachline.ls.huji.ac.il/general/textbooks-sites.htm). These sites are indexed by topics. They offer slide sets for instructors as well as animations and various practice tools for the students.

b. The BioSearch Database (*http://biosearch.huji.ac.il/)* - a joint project of the Silberman Institute of Life Sciences and the Computation Authority of the Hebrew University of Jerusalem. This database comprises links to different types of teaching and learning resources and sites of general interest in the area of life sciences at the undergraduate or graduate level. BioSearch allows one to search by standard keywords along with additional criteria like resource type (emphasizing those that are particularly web-oriented) and peer evaluation score. This database is designed for students, teachers, teaching assistants and researchers.

HUJI's authority of libraries offers all students free access to numerous on-line academic journals and databases. These resources can be accessed from the campus as well as from students' dormitories or students' home (see 3.6.4 for description of library).

In addition to these resources supplied by the teaching program and the university the student union operates its own academic bank. This portal has a highly sophisticated WIKI site (WiKi-Sikkum) with lecture notes of courses which students can access, comment on and rectify http://aguda.org.il/abank/16/223. This portal was initiated last year and the union requested support for this initiative and promote. This support is mainly to help the students who are taking the notes who also get a small bonus in their final grades. Several dozen courses are already in this bank even though it was launched only last year.

3.3.4. Describe the policy of the study program/parent unit regarding lecture attendance. What steps are taken in order to implement this policy? Please describe the current state of events in your answer.

University studies differ from highschool studies, and our basic assumption is that students join the university in order to learn and they can do it by whatever method is most suitable for them. We therefore do not enforce or check attendance in lectures or exercises. Some students prefer to learn on their own from textbooks and from the presentations of the lectures that are routinely posted on the course sites in the teachline internet site.

Attendance is compulsory only where self-learning is not possible – i.e. in laboratories and field trips. Attendance is monitored by the TAs. Students that fail to attend get reduced grades or get no credit at all for the course.

Seminar courses also require attendance. This is essential also as a matter of courtesy so that the respective student will not lecture before an empty class. Attendance in these classes is usually very reasonable as students form a small group and care for each other. Attendance in seminars is monitored by the lecturer responsible for the seminar.

3.3.5. Describe the methods applied to measure the achievements of the students that are used in the study program.

BSc Evaluation
BSc Students are evaluated by the weighted average grades of their entire courses.

Courses
Student achievements in all obligatory and elective introductory courses are evaluated by exams. Weekly assignments and laboratory reports serve as an additional measure for achievements and their grades compose part of the courses final grades. Exams are employed in most other courses as well. Only in a small number of courses evaluation is done by written assignments. These are mainly experimental and field trip courses. In some courses the final assignment is an oral presentation that is judged by the teacher.

MSc Evaluation
MSc Students are evaluated by the weighted grades of their courses (40%), their thesis (30%) and an oral examination (30%).

Courses
MSc students have to study courses amounting to 30 credit points. Achievement measurement in courses varies from course to course, whereby some use exams, while others use oral presentations or written papers.

Thesis
MSc Students are required to write a thesis describing their research. This thesis, typically up to 50 pages long, is submitted to the supervisor who reads and evaluates it. In the evaluation the supervisor includes also his or her opinion of the research performed by the student in the lab. In addition the head of the discipline appoints another faculty member as a second reader who independently evaluates the thesis. The average of these two evaluations will amount to 30 % of his or her final grade.

Final examination
Each MSc Student has to pass an oral final examination. Examination is held by three faculty members: the mentor (who is the chairperson), the second reader and a third faculty member. Team members are specified by the head of the discipline. During the exam, typically up to 90 minutes long, the student delivers a brief talk describing his work. He or she is then examined by each of the three examiners on a topic that he has been asked to prepare in advance. The details of this exam differ slightly from one discipline to another. Each of the examiners grades the exam and the average of these three grades will amount to 30 % of his or her final grade.

PhD evaluation
PhD students do not get a final evaluation. They are either awarded a PhD or not awarded one. A small number of students are awarded a PhD with distinction.

Courses
PhD students are required to study courses amounting to 12 credit points. There are no special courses for PhD students and they take courses from the MSc program and are evaluated in the same manner. PhD students have to pass each course with a grade of at least 75 in order for the course to be accredited. The final grades of these courses do not appear, however in any subsequent certificate.

Thesis evaluation
All the PhD students of the Hebrew University are under the jurisdiction of the Authority for Graduate Students. This authority has two branches – one is responsible for the experimental sciences and the other for humanities, social sciences and law. The forum of this authority has members from the different institutes broadly covering most of the relevant fields.
The authority is responsible for assigning a monitoring committee to each PhD student. This committee is in charge of examining the research proposal of the student and of following his or her progress. The major role of the authority is to find and assign reviewers for the PhD thesis submitted by the student and overseeing the reviewing process. The thesis may be approved, or sent back for minor corrections that do not require a renewed review, or sent back for major changes and reviewed again, or not accepted. If all the reviewers recommend a *Suma cum laude* this is brought before the entire forum during one of its meetings, discussed and decided by majority voting.

3.3.6. Examinations

3.3.6.1. Describe the method of examinations and their character, the relative weight of each type of examination in the final grade (written/oral/open/multiple-choice etc.)

In basic science courses students have exams where they have to solve problems and to calculate the correct answer. In the obligatory and some of the elective introductory courses exams based on multiple choice questions are used. In other instances the exams are composed as a mixture of the above formats. The space allowed for writing is usually restricted to a few lines for each answer. Oral exams are used in a minority of courses.

3.3.6.2. How are the grades distributed? Is this method influenced by statistical considerations?

Ideally, grades should conform to a bell shaped histogram and in most cases the distribution is indeed reasonable. In the large introductory courses the average is usually between 72 and 82. Any serious deviation from this average shows that either the exam was too difficult or too easy. If the exam was too difficult grades are factorized. This can be done by canceling questions that had a very high failure rate (preferably) or by addition of several points across the board. Students have the right to view their exams and to appeal. If questions were seriously flawed these appeals are accepted.

Our institute lacks a computerized checking facility so that it is not easy to find out which questions were problematic. The medical school has such a facility but we have limited access to it. Its advantage is the precise statistical analysis of success rates of each question. Its disadvantage is its very slow turnover. Paradoxically it takes several weeks to get results by this service compared to several hours by manual methods.

The more advanced the courses are, the higher their average grade. This leads to the absurd result that in several small advanced courses most grades are higher than 90. Nevertheless, one should bear in mind that: A. These are elective courses specifically chosen by the students according to their subject preferences. B. Small groups allow the teachers to locate and tackle students' difficulties more easily. In view of these considerations, such high average grades are more understandable.

3.3.6.3. If the relevant information is available, please present (in the format of histogram) the distribution of the overall average grade of the graduates (not including the grade of the thesis for the second degree) for each of the last three years.

Table 3.3.6a shows the final weighted average of BSc students. We were really surprised to see these results, which show that our annual average is virtually identical in the last five years. Some of these years had major disruptions like the extended student's strike in 2007 and the even longer lecturer's strike in 2008. And yet the average final grade has not changed more than by fractions of a percent.

Table 3.3.6a – Final weighted average of BSc student grades last 5 years

Academic Year	Final Average
2004	86.49
2005	87.29
2006	86.18
2007	86.73
2008	86.92

3.3.7. Written assignments (projects, thesis, dissertations)

3.3.7.1. Describe the types of written assignments and other projects required in the program, their contents and scope (seminar papers, degree papers, thesis, training period, practical training etc).

Written assignments are restricted to a small number of advanced undergraduate and graduate courses. In most of these courses students are required to submit assays reviewing research literature. In other courses students are asked to summarize a small-scale research project performed throughout the course. There is only one compulsory course that requires all students to submit a written assignment – the third year undergraduate seminar, where all students have to submit a short abstract describing several research papers to accompany their oral presentation. This total lack of training in scientific writing is a serious shortcoming of our program that is manifested when students have to write their research papers, thesis and grant applications. This problem is aggravated by the fact the students do not acquire sufficient writing skills during their high school studies.

3.3.7.2. What are the methods applied to evaluate written assignments and projects? What kind of feedback, apart from the grade, is given to the students in relation to these assignments and projects?

The written assignments are read and evaluated by the teacher of the course who is a senior staff member. Each teacher has his or her own criteria and explains them to the students when giving out the assignment.

3.3.7.3. What is the average grade given to the graduates of the program in the final project/ final seminar/thesis in each of the last three years. Please present (in the format of histogram) the grades distribution of the final project/final seminar/thesis.

The average grade of third year BSc seminars was 93.16 in 2008. Courses that have written assignments or seminars have as a rule very high average grades that are often in the mid nineties. These courses constitute however a small fraction of all courses (and most of them are only of 2 or 3 credit points) so that they have little effect on the average of the students.

3.3.8. Describe any other methods applied to measure the achievements of the students used by the institution.

All the methods have been described in the previous sections.

3.3.9. In summary, what are the strengths and weaknesses of the teaching and learning? To what extent have the methods applied to measure the teaching and learning achieved their goals?

Strengths

- Our BSc program provides basic fundamental and up to date knowledge of most disciplines of biology.
- We offer a very flexible program with a rich choice of courses.
- Our senior teachers are all active researchers in their respective fields and experienced lecturers.
- Our junior teachers do a very good job in providing tutoring to small groups.
- Our formal, and even more informal feedback systems rapidly identify problems with teaching and we act promptly and efficiently to rectify them.
- We have an excellent e-learning portal that is constantly kept up to date and upgraded.

Weaknesses

- Most of the teaching is heavily based on lectures in front of a large number of students. These are followed by evaluation by multiple-choice exams. It is hard to educate students in a scientific problem oriented manner using the above method.
- We do not encourage enough self-learning.

- We do not provide enough lab courses that are truly research oriented. Some of the labs have mostly a demonstrative value and develop lab skills but only very few simulate research. Only a minority of the students can participate in these more advanced lab courses. We try to overcome this problem by implementing computerized lab-simulating tutorials that require problem-solving skills. At present only a small fraction of our courses include such tutorials. In order to markedly extend the reach of this type of tool, we need a full-time, computer-proficient biologist to lead the project.
- Most students are not exposed to personal tutoring.
- We provide much too little training in oral and especially written communication skills.

These weaknesses are somewhat less severe in the graduate program. However, communication skills are not extensively taught to graduate students and for them these skills are much more important. Advanced lab courses are a huge asset to graduate students, as they enable them to apply what they learn in their research. While we do provide some such excellent and highly oversubscribed courses, more would be welcome. The shortage of labs is definitely due to lack of sufficient funding for reagents, TA positions, technicians and appropriate equipment.

3.4. Students

3.4.1. What are the admission criteria for the program, the selection and admission procedure, the criteria of advancement from year to year and for completion of the studies, including the requirements for being entitled to receive an academic degree. Is there a policy of affirmative action and standards for the admittance of candidates with special needs? In case such policy and standards have been established, please describe them. How are the admission criteria decided upon, and to what extent are the criteria and procedures for admission related to the aims of the program? What have been the lowest admission criteria (psychometric score and matriculation grades) the candidates should meet?

BSc

BSc student admission criteria are based on the matriculation average and the national psychometric exam calculated on a 50 by 50 basis. The precise number varies slightly from year to year and is determined by the authority for student admission. These criteria have very little to do with the academic principles and are intended to achieve a target number of students admitted each year. Biology is a relatively popular and is therefore highly oversubscribed discipline so that the admission criterion to the program is the highest in the faculty (except for special programs). There is a policy of affirmative action for students from disadvantaged populations, so that they can be accepted with slightly lower grades.

Table 3.4.1a depicts the admission criteria to the biology major program, to the outstanding Etgar and Amirim programs, as well as to some programs that combine biology. For comparison we bring the admission criteria of other single major programs in our faculty (Earth science, Physics, Mathematics and Computer sciences), which are in most cases lower than to biology.

Table 3.4.1a Admission criteria to BSc studies at the faculty of Science

Program	Entry grade in 2008
Biology major	20.25
Etgar	23.25
Amirim	25.2
Computational biology	23.25
Chemistry Biology	21.5
Psychobiology	23.25
Physics & Mathematics	19
Computer sciences	22.22
Earth & Environmental sciences	18.75

A student may pass from one year to the next if he or she completed the compulsory courses with more than a passing grade (55) and has a grade average over 60. Exceptions are allowed for a single course in a given year. This course must be repeated and the student must pass it in the coming academic year. A student who failed (or did not study) two compulsory courses may pass if the average of his remaining courses is above 70. These courses must be repeated and

the student must pass them in the coming academic year. A student who failed in three courses will not be able to continue his studies, unless he appeals and gets a special permission and program prepared for him.
A student can graduate our program if he has successfully passed all the compulsory courses and satisfied the overall course hour requirements. There is no policy of affirmative action in force for transfer from year to year. Students, with learning disabilities however, are given special consideration in exams.

Table 3.4.1b Number of BSc students in Biology and related programs

	2005	2006	2007	2008
Biology Year 1	189	155	224	208
Biology Year 2	150	147	171	166
Biology Year 3	183	195	173	154
Psychobiology	74	74	75	84
Biology-Chemistry		42	76	97
Computational Biology	49	49	53	68
Total	**645**	**662**	**772**	**777**

MSc
Students may register for studies towards an MSc in any of the disciplines if they have a minimal average grade of 80 to 85 (depending on the teaching discipline**)** or above from a university or a college in Israel. Students from universities outside Israel have to register via the international school that checks whether their education as attested by the university from which they graduated and their grades are acceptable. Each MSc student has to find an advisor for his research therefore acceptance is conditional to finding an advisor. Registration is to a specific discipline and acceptance has to be approved by the heads of disciplines. They also have to make sure that the applicant has an advisor.

Passing from the first to the second year is never a problem as the students are allowed to divide their studies between the years as they like. Moreover these are good students and failure rates in courses are excedingly small.

Table 3.4.1c Number of MSc students in the different disciplines

Discipline	2005	2006	2007	*2008
Plant Science	19	15	15	11
Cell Biology	14	14	10	9
Genetics	33	21	21	15
Neuroscience	30	33	27	24
Biochemistry	34	18	28	24
ESE	18	18	19	20
Total	**148**	**119**	**120**	**103**

PhD
In order to be accepted to a PhD program a student has to find an advisor and have a minimal average of 85 in their MSc studies from an Israeli university. Students from universities outside Israel have to register via the international school which checks whether their education as attested by the university from which they graduated and their grades are acceptable. In some cases foreign

degrees are not fully recognized. Consequently, the students are conditionally accepted as candidates for the PhD program, pending preparation of a project and submission of a paper.

Direct PhD

MSc students can transfer into a direct PhD track after one to two years as MSc students. This transfer requires the completion of all the MSc courses, the advisor's agreement to guide the student and passing of an oral examination that resembles an MSc exam. Examination is conducted by three faculty members, of whom one is the advisor (who is the chairperson). The team is appointed by the head of the discipline. In the exam, typically up to 90 minutes long, the student gives a brief seminar describing his work. He or she is then questioned by each of the examiners on a topic that he or she has been asked to prepare in advance. The majority of the better students choose this option.

Table 3.4.1d - Number of PhD students

2005	2006	2007	2008
166	151	173	194

3.4.2. To what extent is the relevant information concerning the courses taught in the study program passed on to the students and available to them, e.g. syllabus (bibliography specifying required reading, exercises and assignments, components of the final grade) collection of the examination papers. How is this information brought to the attention of the students, where is it published and how are the students updated on changes that have been introduced?

All information is available to students on the web. Teachers' names, lecture times, a short description of the course contents, credit points and type of final assignment are published in the Faculty's course catalog ("Shnaton"). Since 2005 this catalog is available solely on the web in the University's web site. The on-line course catalog is posted several months before the beginning of the academic year. Information regarding examinations dates & hours and students evaluations of the courses is also available through the same site. In addition the TeachLine portal (see section 3.3.3) allows all students to view in great detail the course contents (e.g. syllabus, grading policy, instructors contact details, lecture materials, weekly assignments, required reading, etc.) The recommended textbooks in the course sites are linked to the Harman Science Library. This allows the students to reserve these books on-line. Bulletin boards in the course sites serve to notify students of changes in tutorial hours, composition of tutorial groups, number of weekly assignments submitted, etc. (Examine the following course site: http://teachline.ls.huji.ac.il/72109/)

Personal information, like the courses to which the student registered, grades, changes in lecture times and location, etc., is available on the web following individual login of the student (https://www.huji.ac.il/cgi-

bin/mm/new/data/student/?). Such information is also sent to students via email and via SMS to their cell phones. All that a lecturer has to do is to e-mail any information to the course number and the message is immediately disseminated to all registered students by email.

3.4.3. What is the yearly drop out rate of students from the program over the last five years, and what are the reasons for their leaving (academic/financial/other)? Is there satisfaction with the drop out rate? In case there is not, what steps does the unit take in order to prevent, reduce or increase drop out?

Regrettably, we do not have information on the drop out rate. In theory these numbers could be easily calculated from the number of students every year (table 3.4.1b), however these numbers do not tell us much. There are a large number of programs, and students frequently move from one program to another during the course of their studies, or join from other programs or universities. We are not concerned about the drop out rate, which rarely affects the better students that we want to keep. As far as MSc and PhD students are concerned the drop out rates are negligible.

3.4.4. To what extent are the program's students involved in research projects of the staff members? Specify in which projects, the number of students involved and the scope of their involvement. Is there a procedure for encouraging students to carry out independent research of their own?

The option for students to participate in research from the end of their first year is one of the strengths of our program. Summer scholarships, guided research and hourly paid work in labs all enable our undergraduates to be exposed to research.

Students of the prestigious Amirim and Etgar programs (about 20 per year) are required to take part in guided research. Other top students (15-30 each year) also take part in a similar course. In addition, dozens of summer fellowships are offered by the faculty, the institute and the department of genetics. Students who do not take part in any of these may still approach members of faculty and apply for a paid job. Every promising student will be offered a position, as such students are potential graduate students. In this manner faculty and students both have the opportunity to assess each other before offering or seeking a placement for an MSc program.

MSc and in particular PhD students are obviously involved in the research of faculty members as they are the major and sometimes only research personnel in most labs.

3.4.5. Counseling systems

3.4.5.1. Describe the system of academic counseling for students before and during the period of study (including reference to the structuring and approval of the study curriculum). Do students with special needs receive special support? If so, please specify.

BSc

Students have a counselor responsible for every one of the three years. In addition they may approach the head of the teaching program, individual lecturers, teaching assistants and the administrative staff with any problem. Each of the special programs has a program head, available for counseling as well. This is the place to highly commend the student union for their help and support to other, usually younger, students.

On the whole, our teaching program is well structured and as long as students adhere to the guidelines and use the widely available information on the university site they do not require extensive counseling. Obviously, students feel most lost and overwhelmed during the first days of their study. The Faculty of Science together with the Student Union organizes special orientation days to help students find their way.

The following issues require more individual help and counseling:

1. Students who take a combination of subjects that causes an overlapping of courses. These issues are dealt with the year counselors, head of teaching program and heads of special programs.
2. Students who fail courses and have to repeat them.
3. Students with special personal or academic problems
4. Students who request to deviate from the prescribed curriculum. In particular common are requests to take fewer courses from certain groups and more from others. The policy of the current head of program who deals with these requests is to allow deviations within reason and to respect the requests of our students.

Students with specials need get extended time for writing exams, or have the questions read to them if necessary. The whole issue of special needs is getting more attention in recent years and the university plans to improve and emphasize the treatment of this population in a centralized manner.

MSc

Master students belong to one of the different disciplines and their head of discipline, as well as their mentors serve as counselors.

PhD

PhD students also belong to disciplines, yet the individual committees approve their teaching program. This committee is however assembled only one to two years after they start their PhD program. Before that time the student may get counseling from their mentors of heads of discipline.

3.4.5.2. Are counseling and assistance provided to students with regard to possible directions for their future professional careers? If so, describe these procedures. Are there work placement services for the graduates? If so, please describe this activity.

We do not offer official counseling in regard to future careers. Students are exposed throughout the duration of their studies to research and researchers at all levels. They feel free to approach and discuss issues such as future jobs both in research and otherwise. The Faculty of Science, the student union and companies who seek our graduates each year towards the end of the spring semester organize a job market.

3.4.6. What are the mechanisms that deal with student complaints?

Students have various options for complaining and appealing. These start from the teacher of the course, the head of the teaching program, the Vice dean for teaching and the Rector of the university. The dean of students can also be approached with complaints (see http://studean.huji.ac.il/).

3.4.7. Does the unit take steps to locate outstanding students (including candidates) and reward them? If so, describe these procedures. What financial assistance is provided to students with financial problems and/or to outstanding students?

The Amirim and Etgar programs are dedicated to outstanding students.

Amirim
The prestigious "Amirim" program is meant to provide a platform to allow highly selected students to be exposed to a broader range of studies than is generally possible. This program is a faculty wide program including students from the entire Science Faculty. These students receive a stipend, are allowed an unlimited number of course hours, and are required to complete an independent research project by the end of their BSc.

Etgar
This program is intended for the top 10% of the biology students, and students of various combined biology programs (everything from dual biology and physics to biology and bible studies). Students are contacted after registration and offered to participate in the program. This program enables student tutoring in small groups on certain subjects already during their first year. Certain courses are intended solely for these students and they are required to complete an independent research project by the end of their BSc. Unfortunately we don't have resources to financially support Etgar students. Moreover, the policy of the university to charge for extra credit points hits these student more than others as the Etgar program requires more credit points then the regular students.

Financial help to students in need is generally done by the assistance department of the Hebrew University and is not related to our teaching program.

3.4.8. Does the institution and/or the parent unit maintain contact with their graduates, employers, and with employment market. If data is available, please specify the measure of integration of graduates into the labor market (which is especially relevant regarding study programs in professional fields): where have they found employment, what positions do they hold, how much time has elapsed between graduation and employment, and how many students continue their studies to advanced degrees or other areas (specify area of study and degree level). Please supply the data on the number of graduates who have completed their studies with distinction. Relevant survey of the unit/institution on this matter might be provided.

BSc

Unfortunately we lack the resources for such an enterprise and have almost no information about the fate of our graduates, who do not continue to graduate education. The most important group of graduates for us is, however, the one that continues to post graduate studies. Most of these study for MSc and PhD degrees in our institute or in the Medical School of our university. An important fraction however registers each year at the Weizmann Institute in Rehovot. From data obtained from the Feinberg graduate school of the Weizmann institute it seems that annually between 8 and 16 of their MSc students (representing 12% to 24% of the total students they accept) have studied at the Hebrew University (mostly but not exclusively in our program). We are proud of these graduates, yet we are also sorry to see them leave as they are usually amongst the best graduates in each year. Other graduates can be found in graduate programs of any other university nationwide but we lack concrete data.

In addition, our graduates can be found in the biotech industry, high school teaching, civil service and almost any other employment, often not related to their studies.

Graduate students

The follow-up of our graduate students is of great importance for understanding the impact our program has on science and other fields in Israel. We do not maintain records of this information and have therefore decided to get this information from the mentors of these students as part of questionnaires they had to fill out for this report. The results of this survey may be found in diagrams 3.4.8a and b. Each member of the institute was requested to fill out the current position of each of his MSc and PhD students in the last 5 years and 10 years respectively.

MSc

The data we collected is far from being exhaustive, however, it is sufficiently substantial to show some interesting trends. Figure 2 presents analyses of the current status of former MSc students, as reported by their mentors (excluding the ones with unknown positions). The table shows that a striking half of the MSc students graduating from our program continue to a PhD program in our university, a further 12% are PhD students at the Weizmann institute and 9% in other universities in Israel. 9% are doing a PhD abroad. 17% work in various biotech industries and 5% in the public sector (hospitals, army, Nature reserve

authority etc.). As a matter of fact, the fraction of PhD students is even higher than can be learnt from the data provided, as many MSc students never complete their MSc but change to a direct PhD program.

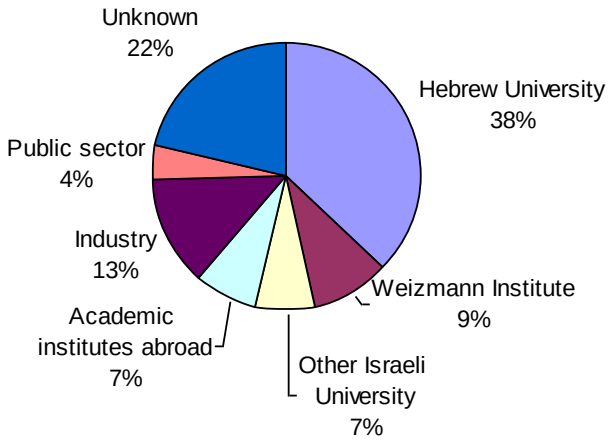
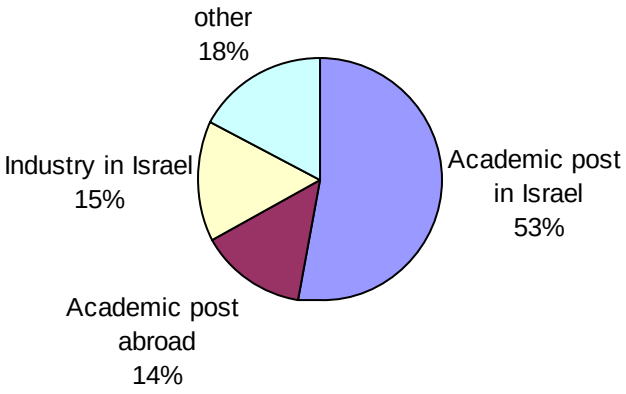


Diagram 3.4.8a – Current status of MSc graduates in the last 5 years (excluding those of unknown status)

PhD

We obtained data about 137 PhD students who graduated during the last ten years. 39 of them, mostly the ones that graduated more recently are currently postdocs. 51 graduates, more than half of those who were no longer postdocs hold academic positions in Israel. This is maybe the most important data from the entire self-evaluation report as it clearly demonstrates the impact of our program and institute on the higher education in Israel as a whole. A further 14 students have academic positions abroad representing a sizeable brain drain as many of them have positions in top American and European institutes. 15 hold industry positions and for a further 17 we had no data.

Diagram 3.4.8b – Current status of PhD graduates in the last 10 years (excluding those that are still postdocs).



Postdocs

We obtained data also for our postdocs but for reasons I will outline below this data is harder to analyze. The large majority of MSc and PhD students in our program have studied in our program or in another university in Israel. A considerable fraction of our postdocs however come from abroad and go back after completing their postdocs. Israeli PhD graduates opt for postdoctoral training in our institute either for an interim period before doing a second one abroad, or when they have no academic aspirations. A PhD that has no overseas

postdoc experience (as a rule) will not be offered an academic position in most Israeli universities.

3.4.9. In summary, what are the strengths and weaknesses of the issues specified above?

Strengths

Our program accepts many excellent students and offers them a flexible and very varied curriculum. The best BSc students have the chance of getting involved in research very early on in their studies. Many of the top students continue with their MSc and PhD studies either in our university or at the Weizmann institute. Most of the PhD students who complete their studies in our institute and continue to a postdoc abroad become independent researchers in the Israeli higher education system.

Weaknesses

The program accepts a large number of students of very different capabilities and our program has to cater to all of them. We lack any follow up of the fate of the majority of our BSc students who did not continued to a Msc degree. This is a serious problem as we don't know how much our education indeed promoted their career and how we can modify and improve it.

To this section, please attach the data concerning candidates admitted and enrolled in the last five years

(according to the level of degree):

- **Number of candidate students, admitted and enrolled.**
- **The actual admission requirements (in the format of a histogram): the distribution of the psychometric score (or its equivalent), the distribution of the matriculation grades.**

3.5. Human Resources

3.5.1. Teaching Staff

3.5.1.1. Describe the profile of the program's teaching staff in the format of the tables 2a through 2d (pages 15-17). What are the areas of specialization of the staff versus the requirements of the study program? To what extent does the staff profile enable flexibility and dynamism within the program?

Senior Teaching staff – Tables 6.2A-C

The senior teaching staff consists of the faculty members of the Life Science Institute (table 6.2A), of faculty members from other institutes of the faculty of science, who provide basic science courses and of faculty of the medical school (table 6.2B). All these are active researchers and experts in their fields. Obviously many teachers do not conduct active research in the fields of the basic introductory courses but are nevertheless capable of teaching them appropriately. Our staff, in addition to our colleagues from the medical school, is well capable of covering most of the subjects, which we deem appropriate, at high level for the education we aim to provide. The dynamism is mainly provided by new faculty members who bring with them novel research fields and establish new courses. We are blessed with a considerable number of emeriti staff who volunteer to continue and teach in our program (table 6.2C1). This enriches us both in fields out of the scope of our current staff and also helps to ease their load. Several of our technical staff are accomplished researchers and teachers in their own right and teach in our program (table 6.2.C2) on a voluntary basis. We have further two adjunct professors – Prof. R. Kornberg from Stanford who spends several months in our institute and gives a course every other year and Prof. Efrat Levi-Lahad a distinguished geneticist from Share Zedek Hospital who is also teaching in our program.

Unlike other faculties in the university we employ only very few external teachers (2) to cover subjects that are beyond the scope and teaching capacity of our senior staff (table 6.2C3). These are the manager of the botanical garden who teaches a course about plants and a teacher in Darwinism. Finally several of the faculty of the IUI in Eilat, who are not faculty of the Hebrew University, also teach in our courses (table 6.2C4).

Junior Teaching staff – Table 6.2D

The junior teaching staff consists of teaching assistants who are recruited from our best MSc and PhD students. They have all recently learned the courses they teach and are therefore highly involved in their teaching subject (table 6.2D).

3.5.1.2. What specializations and skills (including experience and training) are required of the staff members teaching in the study program, including those who teach practical courses/practical training. Are their research areas related to the study program (e.g. do the staff members teach special courses that are related to their areas of research or to areas in which they have gained a reputation)?

According to university tradition our teachers are first and foremost active researchers. They do not get any substantial training in teaching and learn by

experience. Most of the new faculty we recruit have previously been teaching assistants and gained extensive experience before their postdoctoral training. This experience again stresses the immense importance of teaching assistants not only as a teaching force but also as an apprentice stage for generating new faculty members who are not only excellent researchers but also good teachers.
We provide only a limited number of practical courses that are given by expert teachers in the field. As we are free to decide which practical courses we provide, these courses are always given by expert teachers.
Obviously many of our teachers do not conduct active research in the fields of the basic introductory courses but they are capable of teaching them appropriately. Our staff, in addition to our colleagues from the medical school is fully capable of covering at high level most of the subjects we deem appropriate for the education we aim to provide

3.5.1.3. What steps are taken to ensure that staff members are updated, academically and professionally, with regard to the program?

We rely on our faculty who are all active researchers to keep updated in their respective fields. We do not monitor or take any steps regarding this issue. However the heads of disciplines and head of program assign teachers to the different courses and make sure to match their field to the courses they teach.

3.5.1.4. What are the rules, criteria and procedures for appointing the head of the study program and the staff, including tenure and promotion, the standard duration of service at each position, renewal of appointment in elected positions and dismissals? Are you satisfied with these procedures?

The head of the program is elected by the general assembly of the institute. Towards the end of the tenure of the head of the program a general assembly is convened that elects a search committee headed by the head of the institute. This committee searches for a candidate or candidates (it is rarely more then one) for the position from among the associate or full professors of the program. The optimal candidate should have extensive experience in teaching, good knowledge of the program, good personal relations and most important willingness to accept the job. Once such a candidate has been identified he is presented before a second assembly that elects him or her. The head of program serves also as deputy of the head of the institute (who is elected in a similar manner). The head of program serves for three years and the service can been extended or renewed but this has never happened. No head of program has ever been dismissed, however some have resigned for personal reasons.

3.5.1.5. What is the definition of the position of the head of the study program? What credentials (experience and education) are required for this position.

There are no official credentials except for a minimal rank of tenured associate professor. The head should have experience in teaching, good knowledge of the program, good personal relations and most importantly motivation to perform the job. The complete lack of training available for this post (as well as any other managerial post performed by faculty members) is a problem that should be addressed by the university.

3.5.1.6. How is full employment defined in the institution for senior and junior staff, and how many hours are they required to teach in each of the study programs?

Senior staff

We do not define or quantify precise frontal teaching loads of senior staff. Basically we aim to fairly distribute the teaching load between all the teachers in each discipline in order to cover all teaching needs. We are aware of the fact that our frontal teaching load is lower than that of other teaching programs. First because we do not provide service courses to other students (as done by teachers of the chemistry, physics, math etc) and second due to the considerable number of faculty from the medical school who teach in our program. This apparent low load is however a direct product of the immense dynamism of current biology. For teaching biology to undergraduate and graduate students at the highest level it is vital to maintain a thriving up to date research community covering all central biological disciplines. Moreover, in addition to frontal teaching our faculty members are busy mentoring MSc and PhD students.

Junior staff

The official teaching load of a full teaching assistant position is 22 weekly hours. This includes preparation of tutorials, marking excercises and lab reports, preparatory labs etc. a factor of 2 is applied to this load. PhD students are awarded a 40% position and MSc students a 25% position. The official load is therefore about 4 hours per week for a PhD level TA and 2 hours for a MSc level TA. Usually an MSc TA teaches one course (several groups) while a PhD TA teaches two courses or more groups. In most cases the entire teaching is concentrated in one semester to prevent it from being too disruptive for their research work.

3.5.1.7. Are staff members obliged to serve as advisors for final projects, theses and dissertations? Are there criteria for assigning advisors to the above-mentioned papers and projects?

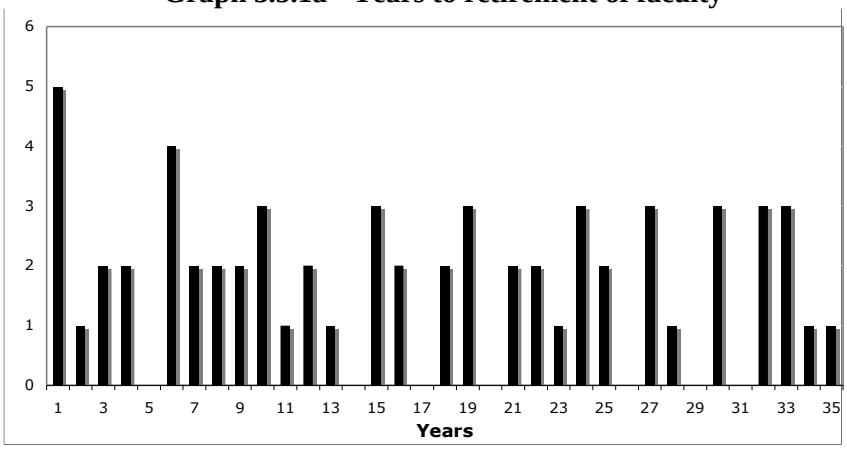
Staff members are obliged to serve on MSc thesis committees, and as examiners of MSc and direct PhD exams. They are assigned to these jobs by the heads of disciplines. In addition they have to serve on PhD committees and review PhD theses. The jobs are assigned by the Authority for Research Students.

3.5.1.8. What is the policy regarding recruiting and absorbing teaching staff (senior as well as junior) and what are the plans for the future recruitment to the study program under evaluation? How are these plans made and by whom?

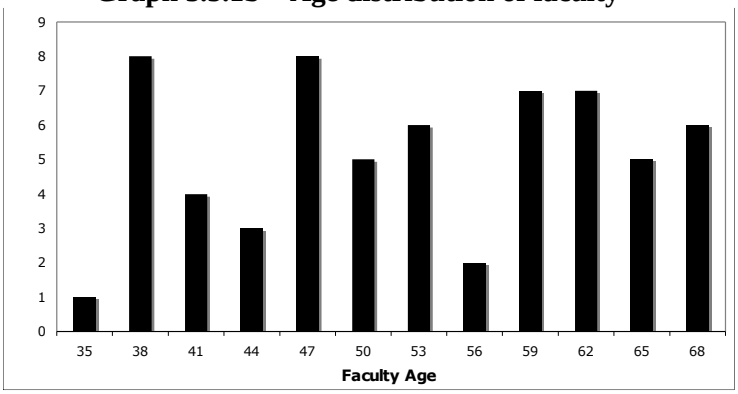
Senior teaching staff – currently 63 full time positions

The Silberman Institute is currently composed of 63 full-time faculty members. Their age distribution and years to retirement are in graphs 3.5.1a & b respectively.

Graph 3.5.1a - Years to retirement of faculty



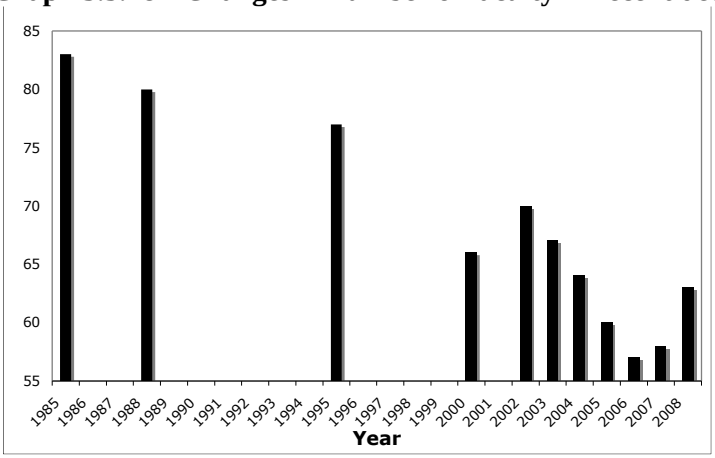
Graph 3.5.1b – Age distribution of faculty



The above data for the present state of the Silberman Institute reflect a relatively uniform distribution of age of the different faculty members. Moreover, the anticipated retirement shown above mandates that an average recruitment of three new faculty members per year is required in order to maintain the institute's present size.

However, the above picture is grossly misleading since the Silberman Institute has seen drastic cuts in its faculty number during the course of the last two decades. Specifically, as shown in graph 3.5.1c below, the Silberman Life Sciences Institute has shrunk from more than 80 faculty members to its current state in a decade and a half and is now in a steady state since the turn of the millennium. Such shrinkage, in an era where biological sciences play such a preeminent role, and develop so rapidly is undesirable. Moreover, it does not enable us to cover all the disciplines required by a leading life science institute and biology teaching program. Finally, it is important to note, as demonstrated below, that virtually all the scientists in the institute are actively conducting research up to their retirement and well beyond it, and that the phenomenon of "dead wood" has virtually disappeared in recent years.

Graph 3.5.1c – Changes in number of faculty in recent decades



Recruitment and adsorption of new members of staff is thus one of the most important issues dealt by the management of the institute, as they are vital for maintaining and developing our research and teaching capacity. Recruitment is performed by a search committee headed be a senior member of the institute and includes representatives from all the different disciplines of the institute. This committee processes the files of all the applicants, meets them and listens to the seminars they present. It then discusses all the applicants and grades the top ones. This information is given to the head of the institute who is not a member of the committee (but is an observer at its meetings) who usually acts upon them for appointing new faculty. The head of the institute has to get these candidates approved by the central committee of the faculty of science, the dean and finaly the president of the university.

The major criterion for selection which far outweighs all others, is scientific excellence. In addition development plans in fields of priority are also considered. Teaching capacity and priorities usually play only a very minor role in these decisions.
Certain fields of priority recruitment have been set by the university. In such cases the university allocates extra positions (usually 50% of a position) to strengthen these disciplines. Candidates to these special positions must still meet rigid academic criteria, however they do not compete with all other candidates. In this manner we recently recruited an expert on zoological collections and a lecturer in bioinformatics.

Every few years, development plans are formulated by the institute but for several reasons they have relatively little impact. Each year we have several dozens of candidates but only a small number of them are really top candidates who are suitable for our institute and they do not necessarily fall into priority fields. The worst problem however is our competition with other institutes and universities for these top candidates. For example we have failed year after year to appoint a lecturer in systems biology in spite of our relatively generous offers. Other institutes, mainly the Weizmann institute offered a better deal and once they have established a centre of excellence in this field it is hard to compete for top candidates.

The Jerusalem Effect: Over the years our Institute has had not only to compete with other biology institutes in the country, but also with what we euphemistically

call the "Jerusalem effect". The geo-political and demographic situation within Jerusalem is, for many potential faculty candidates and top students, a non-trivial obstacle to overcome. This effect is at times a deciding factor in the competition for the top young faculty recruits in the country, in attracting top post-doctoral candidates, and in our efforts to retain the best students for graduate school. Most new faculty members in our institute live outside Jerusalem and commute daily.

Junior staff - about 120 positions

Our junior teaching staff members are appointed from among our top MSc and PhD students. Competition for these jobs is fierce and the appointment process is one of the most difficult and controversial issues that the head of program has to deal with.

I will describe here the criteria applied for these appointments, but will first dwell on some of the contradicting philosophies.

One approach suggests that these appointments should be based on the merit of the students alone (how we measure that see below). The second approach claims that, since the teaching budget is the only support our institute receives in cash from university sources, it should be divided in a more equal way so that more groups will get a share of TA positions. These positions are considered a support to the research group, as it saves about half the fellowship a mentor has to pay from his research grants.

The former philosophy prevailed until three years ago leading to a situation where some labs had five or even seven positions while many others had none at all. In recent years, also in view of the worsening budgetary situation, we imposed a capping policy where the program pays no more than three TA positions per lab. If a lab has more then three students who are eligible (based on merit) the mentor can pay for the TA positions himself. Several mentors indeed pay for such positions out of a feeling of commitment to their students wanting them to acquire teaching experience (thereby enlarging our teaching force). Other mentors refuse to do so for financial or ideological reasons.

Table 3.5.1d – number of TAs during the last four years

	2005	**2006**	**2007**	**2008**
Msc TAs	43	35	33	30
PhD TAs	70	73	84	81
Total	113	108	117	111

How we measure student merit and calculate criteria for TA appointments

Until four years ago the only criterion for appointments was the weighted average of the BSc grades of an applicant, both for an MSc and a PhD TA. The MSc grades were considered inflated and not used in the case of PhD appointments. Moreover MSc appointments were automatically extended to a PhD appointment that could be up to five years long. We felt that using this single criterion is unfair and a new set of criteria is now in place. These include the BSc and MSc averages, scientific publications and prior experience in teaching (for PhD applicants). In addition, applicants from labs of young faculty or of labs that don't

have a TA get extra points (this has nothing to do with the merit of the applicant of course).

Another consideration we must take into account is the requirements of teaching in different disciplines. TAs are often moved from one discipline to another but not every one can teach any course. These considerations are under the discretion of the head of the teaching program.

The TA position is now no longer automatically renewed from MSc to PhD, however, the teaching experience criterion gives PhD TAs an advantage in their application so that it is very rare that such a renewal does not happen. Students who did not have an TA position during their MSc studies can volunteer to teach to gain teaching experience. This is then accredited to the student in the next round of TA position allocations thus increasing their chances of being appointed. Indeed two such volunteers who did an excellent job recently got positions.

Another recent restriction imposed by the faculty of science is the limitation of PhD positions to four years, which no longer covers all the time a PhD takes, so that the fifth year requires other funding.

3.5.2. Technical and administrative staff

Describe the technical and administrative staff, including the number of staff members and their job descriptions. What kind of support does the technical and administrative staff provide for the academic activity?

Technical staff – 50 positions
Traditionally most labs in the institute had one full time technician. In addition we had several technicians that ran central shared facilities like electronic and confocal microscopes, interdepartmental facilities, as well as the teaching laboratories. In no other aspect have the budget cuts imposed on us had such a catastrophic effect as the elimination of a large number of technical positions. Within a short time the standard of technicians per lab was reduced by 50% so that each lab is now entitled to half a technician. A technician is not a piece of paper that can be cut into two and such a measure caused huge damage and suffering to the remaining technical workforce, many of whom are excellent, highly qualified, devoted and long term employees.

Although support for the purchase of new equipment was cut, funding for equipment can be obtained (with great effort) from external sources. Technicians to operate this equipment and to maintain our research labs can be funded in the long term only from university sources.

This cut has had a very deleterious effect on the training of our under-graduate students. Technicians have to help to develop, establish and run student laboratory courses. The severe cut in technical manpower both at the level of individual research labs and of the teaching laboratories has limited the capacity of preparing labs and developing new teaching modules.

The worst effect of this cut in technical manpower is however on the training of our graduate research students. These students get much of their technical and scientific training from the technician in the lab and this has now been severely compromised. Moreover technical jobs in the lab, traditionally the job of a technician must now be done by students. This situation is unbearable and must be changed as soon as possible.

Administrative staff

Our highly professional administrative staff is the backbone of the management and of teaching program of our institute. The head of the institute and the head of the teaching program are replaced every three years. As such both appointees start with minimal experience and knowledge in management. We therefore rely heavily on the administrative staff.

The administrative staff of the institute consists of 12.5 full time positions and is divided into three locations: The institute management, the teaching secretariat and the management of the different departments.

The institute management (three full time staff)

The administrative director, Mrs. Daniela Ashur, is responsible for the managerial and technical administration of the institute under the responsibility of the institute's chairperson. She is responsible for dealing with the technical and administrative staff, managing the budgets of the institute and of the teaching program, dealing with safety and security, managing teaching and technical support for teaching, maintenance, development and building, absorption of new faculty, purchasing of equipment and chemicals for teaching, preparation of reports in various fields, interaction with external agencies etc. The manager has one secretary who helps her with all her responsibilities, is responsible for the ethics committee and provides general secretary services to the institute.

The secretary of the institute's chair Mrs. Ruth Lischinski, aids the chair with all his responsibilities. She is in charge of the recruitment and promotion of the academic staff and of organizing the meetings of various committees of the institute. She is also responsible for the internet site of the institute and its updating.

Teaching secretariat (Six full and part time staff)

The secretariat, managed by Mrs. Pnina Banay, is in charge of BSc, MSc and PhD studies of the biology program including some of the special programs. This secretariat is under the responsibility of the head of the teaching program. The secretariat has two secretaries responsible for the biochemistry, neurobiology and cell biology. Part time secretaries serve the teaching demands in genetics, plant science and ESE and are located in the departmental offices.

Management of departments

Each of the six departments has a full time administrator and a part or full time secretary. These help to manage the department under the responsibility of the head of the department. They help to manage research grants, departmental activities and seminars, manpower issues etc.

3.5.3. **In summary,** what are the points of strength and weakness of the human resources (teaching staff, technical and administrative staff)?

Senior teaching staff

Our senior staff consists of active and dedicated scientists, many of them of international standing. They are experts in their respective fields, up to date in what they teach and present an example of dedication to science. Some of our introductory courses are given by lecturers from other institutes on campus, and they too are doing a very good job. Our alliance with the medical school considerably enriches our program with dozens of first-rate scientists who teach in our courses.

The weakness of our staff is our aging workforce that was not sufficiently replenished to keep up with retirements. This lead to considerable shrinkage of the institute from more than 80 faculty members twenty years ago, to about 60 today. There are fields we do not cover anymore (like zoology) and others like systems biology that we can't cover for the lack of suitable faculty.

Junior teaching staff

This staff, composed of our best MSc and PhD students, as a rule, does an outstanding job in tutoring in laboratories and in exercises. They present first-rate dedication, excellent communication skills and are highly professional. A considerable part of what the students learn and problem-solving skills they develop is thanks to our first rate junior staff.

Technical staff

Technicians in individual research labs and central facilities serve as the backbone of research activity. They provide continuity in the lab and keep a safe and functional research environment. Our technical staff has been drastically cut down in recent years. We lost many positions to early retirement and these positions have not been renewed. Many of our technicians are doing an excellent job and are highly experienced, some are less proficient.

To this section, please attach the following information:

- **The teaching workforce (senior and junior teaching staff employed, external senior and junior teaching staff, teaching and research assistants, post-doctoral staff members) in the format of the Tables 2A through 2D (in chapter 6 of this document, pages 15-17).**

3.6. Infrastructure

Note: In this chapter, describe the overall physical infrastructure that serves the unit and the study program under evaluation. To what extent does this infrastructure enable the parent unit to operate the study program according to the set aims and goals?

3.6.1. Administration

3.6.1.1. What is the physical location of the unit in the institution, in which building is it located, and where does the study program under evaluation operate? Do other study programs share the building?

Five of the departments of the life science institute are located in the Silberman building on the Givat Ram campus. The sixth department, ESE, is located in the Berman building at the other end of the campus.

The Silberman building is composed of three wings, each containing four to six floors. The building houses the individual research labs, departmental equipment areas and temperature rooms, as well as numerous biological service centers. Amongst such service centers are: the center for genomic technologies, interdepartmental instrumentation unit, bioimaging unit, Biacore unit, protein expression & purification facilities, etc. The Silberman building also houses administrative areas, a cafeteria, three dining areas in each of the wings, four teaching classes and a medium sized lecture hall. All basic science and introductory courses are given in other lecture halls throughout the Givat Ram campus (see 3.6.2 and http://science.huji.ac.il/map/easymap/newmap.php).

Life sciences laboratory courses are held in the teaching-laboratories building that serves the Institute of Chemistry and the Institute of Physics as well. Available to us are six student laboratories covering ~300 m^2. In addition, there are temperature rooms, storage rooms, preparation rooms, a heavy instrumentation room and a seminar room covering ~200 m^2.

3.6.1.2. What is the location of the secretariat/administration of the parent unit? Does the study program under evaluation have a separate secretariat?

The major secretariat of the teaching program is located in wing 1 of the Silberman building alongside the administration of the institute. Offices serving some of the disciplines are located in the respective departments – genetics in wing 2, and plant sciences in wing 3 as well as ESE in the Berman building. The other disciplines: neurobiology, biochemistry and cell biology, are served by secretaries in the central teaching secretariat in wing 1. Up to several years ago all secretariats were located in the departments however three years ago there was a move to concentrate them all. For internal and personal reasons this move could not be completed but the current state works well and does not require changes.

3.6.1.3. How many rooms serve the academic staff (senior, junior and external) and technical staff of the program, and what standard equipment is available in each room?

Each new member of our institute is allocated two lab modules and an office. The size of each module is about 25 m^2 each and has space for 4 research students (or

more if two students share a bench). Many faculty have much more space (up to 250 m^2) according to their specific requirements, the size of their research group and specialized equipment. On the whole, our institute offers sufficient space and only very few research groups suffer from lack of space. Most of the equipment is purchased from a start up package and from equipment grants. Again some groups have only basic lab equipment while others have very elaborate set ups.

3.6.2. Classes

3.6.2.1. How many classrooms, seminar rooms, rooms for group activities, and auditoria serve the study program, how many seats do they have, and what equipment can be found in each room /classroom/auditorium (including reference to the possibility of using personal laptop computers on campus).

Teaching in biology takes place throughout the Edmond Safra Givat Ram Campus of the Hebrew University in Jerusalem. This is a beautiful campus with large green areas and wonderful gardening. The basic science courses and the obligatory introduction courses take place in several large lecture halls spread throughout the campus. This may require some walking between lectures of up to 400 meters. The climate in Jerusalem is mild and such distances are no problem for our students. All halls have wheelchair access with nearby parking. All these halls are fitted with the latest “smart tables” viewing equipment and are connected to the web.

Once students start their third semester they take courses with typically less then 100 students that take place in the building of the Life Science institute. This building has one large (120 seats) hall and four smaller classes with 30-100 seats. Most courses take place in this hall and classes. Classes are equipped with PCs and projectors set up, and are connected to the web.

Our classrooms have not been renovated since they were built in the late seventies and are run down. The viewing equipment is rather old and tends to break down. Tutorials also take place in other classes on campus, like those in the Sprinzak building. These classes lack viewing equipment. Only two dilapidated toilets served all four classrooms on the fifth floor. Fortunately these have been renovated recently and expanded to five modern toilets.

3.6.2.2. How many computer labs serve the students in the program, and how many computers are there in each lab? Specify the existing hardware and software, and state if it includes special hardware and/or software. Specify the institutional and unit computer lay-out, and how it serves the parent unit and the study program.

Our students have ample access to computers in the central Berel Ginges Computer Centre as well as in the Silberman building. The Berel Ginges Computer Centre contains four classrooms with 99 workstations. In addition 90 workstations are available all day long for individual use. Eight of these are multimedia work-stations. The Alexander Silberman Institute of Life Sciences houses two additional computer classrooms with 47 workstations. The following

software is installed in all our workstations|: ACROBAT READER/Foxit reader, ArcGIS, Audacity, B2SPICE – Light, BORLAND J BUILDER 3, BORLNAD C++, CCLAMP;VCLAMP, CodeBlocks, CYGWIN, Dev C++, EXCEED, Eclipse, EcoBeaker, FileZilla, Firefox, GHOSTVIEW, Gsview, Ghost Script, Gimp, GNU EMACS, GNU PLOT, HUCKEL, INTERNET EXPLORER 6,
Lahey Fortran, LATEX /Miktex/Texnicenter, LabView, MATHEMATICA, MATLAB 7/2007b, MS OFFICE 2003, ModelSim, Netbeans, Open Office 2.3, Origin 7.5, Paint.net, PDFCreator, Populus, Putty, Quicktime alternative Player, RealPlayer alternative, SAS, SPSS, TELNET, TURBO C ++, TURBO PASCAL, Ultra Edit 32, VIM FOR WINDOWS 6.1, Visual Minteq, Winmerge, WinZip, X TO CS.

Over twenty wireless access points are available throughout the campus as well as in the student dormitories. Their location is depicted in
http://ca.huji.ac.il/services/internet/connect/wireless/grmap.shtml.

3.6.2.3. Do the parent unit and study program have access to additional facilities for special purposes, e.g. conference rooms, study centers, research centers and meeting rooms? If teaching activities take place outside the campus, please specify which activities and the frameworks in which they are carried out.

Our program has access to the conference rooms of the management of the institute and these serve for MSc examinations. The faculty club in Silberman building is used for seminars of the different departments, international meetings and end of year sessions of the "supervised project" courses. No teaching takes place outside the campus except courses that take place in the interuniversity institute of marine science in Eilat.

3.6.3. Laboratories

What laboratories serve the program, who makes use of them, how are they equipped, and how many seats do they have?

Teaching laboratories
Until several years ago our teaching labs were located in old sheds on our campus. These sheds were demolished to make room to the new school of engineering and replaced with a beautiful and modern new teaching laboratory building. At this opportunity we also moved all the teaching labs that were located in the Silberman institute (our main research building) to the new building. This move had two advantages. The first was concentrating all teaching labs in one modern, new building which facilitates the running and preparation of the laboratory classes and rationalizes the use of equipment. The second was that it freed considerable space in our main research building to set up labs for new faculty recruits.

The main disadvantage of this move was that teaching lab space is relatively restricted, constraining the timetable of the lab courses and slightly restricting future development of such courses. A minor problem is that these labs are far from the research building so that some advanced equipment that was used and which is in the research building is now less accessible to lab courses.

The new building is indeed a great asset. Its only problem is that many of the labs are big and should have been split into half (enabling more groups in parallel as groups are anyway restricted in size by teaching and safety considerations). Currently this restricts the number of the groups or requires two groups to share one room which is problematic as well.

As far as equipment is concerned, the labs are still lacking, but most of the required equipment has been purchased during the last two years. Development of more advanced lab courses will require more investment in costly equipment like fluorescent microscopes and equipment for cell culture.

Research laboratories

Our graduate students as well as our "supervised project" students get most of their training in the individual research laboratories. These are located in the Silberman and Berman buildings. The level of equipment and facilities varies of course, but most of them are well equipped and in good state. Some of the shared equipment is old or has very long waiting lists.

3.6.4. Library

3.6.4.1. Describe the library which serves the students and the teaching staff of the study program: its location, its physical structure, the number of titles according to subjects, journals, computerized databases, the number of obligatory books relative to the number of students, opening hours, number of seats, number of computers, the library's professional staff and their qualifications, to what extent do the students receive assistance and guidance in the library, the ability of students and teaching staff to use the databases from outside the library (using a code to connect to the computer). Specify likewise the policy guiding the purchase of material for the library: how are decisions made with regard to the purchase of books, journals, computerized databases etc. and based on which recommendations/requirements, what are the procedures for updating the library, is there a clear and well-defined budget for the library?

The Harman Science Library

General background

The Harman Science Library, named for Avraham Harman, was established in 1984 when the Faculty of Science merged the collections of six departmental libraries: chemistry-physics, botany, genetics, zoology, biochemistry and applied science into one central science library. In 2004, the Library of the Science Teaching Center was integrated into the collection.

Until 2003, the library was part of the Faculty of Science. When the university established a new administrative entity, the Hebrew University Library Authority, there was reorganization and the library became part of the new Library Authority.

However, the Library's connection to the Faculty of Science continues, emphasized by the fact that an academic member of the Faculty of Science,

appointed by the Dean, serves as the chairman of the Harman Science Library committee and gives valuable guidance.

The Harman Science Library is the central science library of the Faculty of Science, which serves all students, teaching staff and researchers in the fields of chemistry, physics, life sciences and science teaching. It also serves first year students of mathematics, computer sciences, earth sciences, medicine, pharmacy, medical sciences, and the school of engineering, who study on the Givat Ram Campus. Staff members and students from other campuses, students and lecturers of local colleges, the high tech community and others make frequent use of the library.

Building facility

The Harman Science Library is located on the Edmond Safra Campus at Givat Ram and is housed in the Kaplan Building at the center of the campus. There are six levels, each of which houses a section of the library collection, arranged to accommodate the needs of the patrons. A new wing was added to the library building last year to store a section of the journal collection.

There are:

- 9000 running meters of shelving in the library.
- 3700 running meters of monographs.
- 5300 running meters of journals.

Organization of the collection

The collection is arranged as an open shelf system in which patrons search the online catalog and have free access to books and journals.

- Journals are located on three levels, each arranged alphabetically by journal title.
- Monographs, which include text books, research books, reference books, series, dictionaries, theses and rare books, are located on the other three levels arranged by the Library of Congress Classification.

Collection – holdings

There are:

- 58,357 monograph titles.
- 98,562 monograph items including volumes and multiple copies.
- 3,784 journal titles.
- 215,000 journal volumes.
- 19 electronic databases.

Required reading course textbooks

The library purchases those textbooks that are assigned as required reading by lecturers. In order to meet the needs of students, the library tries to maintain a proportion of one copy per 12-15 students registered in the course. This is subject to the recommendations and advice of the academic teaching staff.

Library hours

During semesters – from the beginning of the school year until the end of July

- Sun-Wed 9:00 – 22:00
- Thur 9:00 – 18:30

Summer hours

- Sun – Thurs 9:00 – 18:00

Seating capacity and computer stations

There are 338 seats distributed in the various reading rooms throughout the library. Some levels have been designated as quiet areas and others as group study areas. In the textbook reading room, one senses the vibrancy of earnest students in groups of three or more, carrying on discussions or working on problems together. The reading rooms containing journals, research monographs and reference materials are for individual study, quiet areas for reading and study.

Over the past years, additional computer stations have been added for the use of patrons, which include ports for laptop computers and areas set up with wireless installation. Patrons can search the library catalogs, the Union List Catalogs, databases and electronic journals from 49 computer stations throughout the library. Email, Microsoft office applications and additional programs essential for Faculty of Science courses are also available at computer stations within the library. Printers are available on most levels.

Library staff

The library staff is comprised of librarians, a secretary and workers/students who are hired on an hourly basis. All professional librarians have library degrees: BA, MLS or diplomas. The schedule of each librarian includes a shift at the circulation desk or at the reference department to ensure interaction with library users. Multitasking has been made necessary due to extensive personnel cuts.

Staff –

- **Director**
- **Assistant director**
- **Acquisitions librarian -** Responsible for selection and purchases of books, monographs, CD ROM's, electronic monographs etc. The Harman Library centralizes the acquisitions of all Faculty of Science libraries. (Earth Sciences Library and the Mathematics - Computer Sciences Library)
- **Periodicals librarian** – Responsible for organizing and maintaining the print and electronic journal collection and for subscriptions to print and electronic journal titles.
- **Cataloguer** – Catalogs new monographs, series, theses etc and maintains the library catalog.
- **Circulation and general reference** – Provides all circulation services to the library patrons as well as assistance at the computer stations in adjacent areas.
- **Interlibrary loan -** Provides document supply services through the ARIEL automated system.
- **Reference –** Provides all general reference services, in addition to **i**nstruction sessions given to groups and individuals in the library and throughout the campus on request. The training sessions include orientation tours, introduction to searching the library catalogs, the national union catalogs, electronic databases, electronic journals and others.
- **Aleph systems manager –** Responsible for the running of the computerized system; library liaison with all relevant units.

There are currently 12 tenured employees on 9.75 positions and 3 temporary positions. The library also employs students for an average of 600 hours/month.

In the past three years, 3 librarian tenure track positions have been cut within the framework of the university personnel cutback plan as well as the transfer of a

tenure track position to the newly formed Library Authority. These cutbacks have been felt significantly in the daily running and operation of the library. The workload on the remaining library staff has increased. The recent reorganization of the libraries within the university and the implementation of the new Aleph 500 have created new responsibilities and tasks. The pace of the workflow has slowed down, which affects the level of service provided to our patrons.

Instruction Services

Library orientation sessions are offered to new students at the beginning of each academic year by our reference staff. These include organized tours of the library building with explanations of the available services and a demonstration of our computerized catalog. Librarians are available to answer individual questions at the computer stations during this orientation period.

During the semester, small groups or individuals receive instruction sessions on any one of a variety of topics such as digital databases or reference & bibliographic tools within the library. Our librarians also go to lecture halls on campus to deliver lectures in response to the academic lecturer's requests. There is no lecture hall within the library building to accommodate larger groups.

Access to electronic subscriptions outside the library

Access to most of our databases and electronic journals is available to any computer that is connected to the university network on campus. The exception is a database that is on the local server that enables access ONLY from the library.
Undergraduate students can access electronic databases and electronic journals from home by entering a personal identification code via VPN communication. Graduate students, researchers and faculty are able to connect to internet access from home by entering a personal access code arranged by the Computation Authority of the Hebrew University for qualified members.

Collection development - Acquisitions policy in the library

The library budget is used to purchase monographs (for courses and research), series, journals (print and electronic) and databases. The budget is divided evenly among the disciplines. The extremely high prices of journals in science - experimental science in particular – (chemistry, physics and life sciences), has greatly reduced our budget's purchasing power. The major portion of the budget is spent on journal subscription and a very small percentage is available to purchase monographs.

Dissemination of scientific reports is mainly via journals. The emphasis in the Harman Science Library, as in most other academic science libraries, is to develop and maintain the journal collection.

- **Purchasing Books**

Decisions relating to monograph purchases and collection development is based on recommendations from the academic staff and researchers of the Faculty of Science as well as the reference librarian. The library director coordinates and approves all purchase decisions. The reference staff proposes a list of titles based on book reviews appearing in the scientific literature, from select publishers' catalogs and based on needs and requests of patrons.

During the past few years, with the development of new areas of research in the Faculty of Science, the library has tried to concentrate on developing the collection in these fields. Some examples are nanotechnology, bio-info-technology and neural computation. Unfortunately, the library budget is limited, allowing the purchase of a minimum number of monographs

The purchase of textbooks is based on the recommendations of the course teachers. Acquisition orders are placed after checking for the latest editions and for the number of available copies to determine the needs of the students registered in the course. The collection includes cdroms that accompany many textbooks.

Standing order subscriptions for selected titles enrich the collection as the volumes arrive periodically in print and/or digital format. In addition, the library has an audio-visual collection of videos which include past years' courses and material in the sciences.

- **Journal subscriptions**

In the past few years, a dramatic upheaval has occurred in the nature of journal subscriptions. In the past, most subscriptions were for journals in print format with a small proportion in electronic format. Today, it is the opposite, with most of the subscriptions for the electronic format while fewer are for the print format. Over the past two years, the Library was pressured to reduce the huge deficit in its budget. A joint project, to re-evaluate the journal collection took place with the cooperation and consultation of the Library Committee and the Institute chairs. At the end of the process, many print subscriptions were cancelled and a core journal collection was identified. This collection reflects the most important journals in the sciences in which our academic researchers work. Re-evaluations are made every few years. The cancellation of select titles enables the library to add new titles as the demand arises.

Any new journal subscription must have the approval of the head of the Library Committee. Such decisions are based on a variety of parameters such as price, the number of researchers in the field that express interest in the title, the SCI impact factor etc.
In addition to the titles to which the library directly subscribes, our patrons have access to a huge number of titles thanks to the agreements the Library Authority signed with certain publishers. The Hebrew University also signed contracts with the country's consortium, MALAMAD, which enables access to package agreements with the world's largest publishers at reduced prices.

- **Database subscriptions**

Databases in the sciences are extremely expensive and it is very difficult for a faculty library to maintain the expense. The Harman Science Library subscribes to major scientific databases, which include: SciFinder - Chemical Abstracts online, Biological Abstracts, Medline, ACS, Ullman's Encyclopedia of Industrial Chemistry, PROLA-Physics Reviews online archives, Science Citation Index and others. The decision to acquire a new database is made on academic and budgetary considerations. The Library Committee and Faculty of Science Institute representatives make the academic recommendations.

- **Library Budget**

The library budget is allocated by the Library Authority based on the consideration of several parameters relating to the libraries. The budget is defined at the beginning of the academic year and is divided and designated by different budget codes, each defined for a particular type of expense. Most of the budget, as previously stated, is for journal subscriptions and for database subscriptions. The remaining amount is for monographs.

The library budget has not increased in many years. It is allocated in New Israeli Shekels. The price of scientific journals, especially in the experimental sciences, has become very expensive. The average increase from year to year is about 8%-12%. It is clear that the library's purchasing power is limited and the need to cancel subscriptions in order to stay within the yearly budget allotment is a direct outcome of this situation.

	LIBRARY OF CONGRESS CLASSIFICATION	NO. OF ITEMS
B	Philosophy. Psychology. Religion	1100
D	History	385
G	Geography	518
H	Social Sciences	443
L	Education. Science Education	1061
Q	Science (General)	913
QA	Mathematics	2485
QB	Astronomy	1035
QC	Physics	8324
QD	Chemistry	7733
QE	Geology	967
QH	Natural History - Biology	6111
QK	Botany	4104
QL	Zoology	6151
QM	Human Anatomy	171
QP	Physiology	3243
QR	Microbiology	906
R	Medicine	1442
S	Agriculture	1300
T	Technology	5104
Thesis		4861
total		58357

3.6.4.2. Do the institution and the study program take steps to enable the convenient access of the students with special needs to the study material and the different facilities , e.g. classrooms, laboratories, library? If part of the programs takes place on different campuses, how is equal opportunity of access to the facilities and equipment at the main campus ensured for all students?

The university initiated an extensive accessibility program several years ago, raising substantial funds from donors and from government agencies. All our

major lecture halls, classes, laboratories and the library have wheelchair access. The only problem is that courses during the first three semesters take place in big lecture halls scattered on our rather big campus. This could be a potential problem even though all places are accessible and parking is available nearby. The only lecture hall that lacks wheelchair access is the Rachall auditorium. This is a serious problem as it is one of the most important halls for biology studies where all advanced-introductory courses are given.

3.6.4.3. In summary, what are the points of strength and weakness of the physical infrastructure?

Strengths

1. A magnificent campus with many green areas and exceptional gardening and many rare trees. The campus also serves as an open air museum.
2. Good facilities in the major lecture halls.
3. Wheelchair access throughout except in Rachall auditorium.
4. A modern new building dedicated to teaching labs (somewhat too small and too big classes).
5. A well equipped library with online databases and online access to most of the important journals in the field. Our online access to journals is considerably better than in the best US and UK universities.
6. Highly advanced and abundant information technology facilities.
7. Concentration of classes in the Silberman research building for advanced undergraduate and graduate courses.
8. Excellent sport facilities.
9. Computer center support.

Weaknesses

The major weakness that affects both research and education of graduate research students (these two are one single issue that cannot be separated) is our aging central research equipment and facilities. No major (or even minor) investment in this respect was made by the university in recent years. We are lacking several important instruments like a FACS machine and we are lacking even some basic equipment. New equipment was purchased from grant money only, or as part of start-up packages of newly recruited faculty. Worse than the lack of equipment is sometimes the lack of technicians to operate existing equipment due to severe cuts in our technical staff.

A minor weakness is the dilapidated state of the classes in the Silberman building and their unreliable viewing equipment.

Diagrams of the building, a map of the institution and a list of special equipment and other relevant materials might be added to this section.

Chapter 4 - Research

Due to the difference in character and research efforts of the various programs under evaluation, we recommend that each institution handle this chapter as it sees fit.

4.1 Overview of the research activity at the Silberman Life Sciences Institute

We begin by providing an overall description of the institute alongside some statistics regarding the faculty, recruitment and demographics. We follow by a detailed description of individual departments and research activities thereof.

4.1.1 Overall Description

The Silberman life sciences institute is the largest of several institutes within the Faculty of Science at the Hebrew University. As such, it is distinct from other life sciences institutes in Israel that are normally independent faculties (the only other exception being Ben Gurion University of the Negev). This structure has its obvious advantages and disadvantages and is a cause of sporadic discussions of an academic and administrative nature.

The structure of the institute is that of six departments that are formed around different academic disciplines (listed alphabetically): Biological Chemistry, Cell and Animal Biology, Evolution Systematics and Ecology (ESE), Genetics, Neurobiology and Plant and Environmental Sciences. However, as will be self evident below, traditional boundaries between the different departments have all but vanished.

4.2 Detailed description of the research groups within the Silberman Institute

Below we describe the research activities of the Silberman Life Sciences Institute according to the different academic departments.

4.2.1 Biological Chemistry

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Isaiah	Arkin	2000	25	24	1050
Daphne	Atlas	1978	19	10	678
Zvi Ioav	Cabantchik	1981	23	18	640
David	Engelberg	1996	18	12	491
Alexander	Levitzki	1973	51	21	1079
Michal	Linial	1989	45	22	1864
Oded	Livnah	1997	28	12	
Joseph	Orly	1980	10	6	117
Tommer	Ravid	2007	9	12	326
Shimon	Schuldiner	1976	25	26	1019
Julia	Shifman	2004	6	3	267
Hermona	Soreq	1986	58	22	2069

Forename	Surname	Grant income ($) since 2003	Patents since 1998	Awards & honors since 1998	Editorship
Isaiah	Arkin	999,945		1	1
Daphne	Atlas	500,857	9		
Zvi Ioav	Cabantchik	880,000	2	2	
David	Engelberg	772,330	5		
Alexander	Levitzki	1,404,000	19	8	2
Michal	Linial	2,805,000	5		5
Oded	Livnah	1,284,900			
Joseph	Orly	834,000			3
Tommer	Ravid	475,000			
Shimon	Schuldiner	1,820,000			2
Julia	Shifman	155,000	1		
Hermona	Soreq	1,600,000	6	6	5

Research at the Department of Biological Chemistry focuses on molecular and structural biochemistry of numerous systems, including regulatory mechanisms, membrane transport, etc. It may be subdivided into the following sections:

Signal Transduction:
The mechanism of catalysis of hetero-trimeric G-proteins. The histological, pharmacological and clinical potency of signal transduction inhibitors, such as protein tyrosine kinase blockers, ras and colk2 inhibitors as antitumor agents and for the treatment of psoriasis. Study of ras-dependent transcription factors that are involved in the cellular stress response (c-Jun/Gcn4, Msn2/4, HSF). Engineering

of enzymes, particularly MAP kinases to render them constitutively active for studying inflammation and cancer. Relationships between ionic channels and secretory proteins. Mechanism of secretion and specific mutations in voltage sensitive calcium channels. Molecular and neurophysiological mechanism underlying stress responses: Stress responses in transgenic mouse models. Mechanism of heat stress-induced cell cycle arrest in budding yeast.

Cellular Regulatory Mechanisms and Development:
Studies on the mechanism of P-glycoprotein, the multi-drug resistance pump. Transcriptional regulation of genes for biosynthesis of steroid hormone in reproductive organs. Molecular cloning of androgen-processing enzymes. Molecular cloning, antisense inhibition, transgenic manipulations and biomedical implications of cholinergic functions. Structural studies on protein-RNA and DNA complexes involved in regulatory processes. The epigenetics of development, mining the genome of Caenorhabditis elegans. Effect of light on the dynamics of the photosynthetic membrane chlorophyll-protein complexes: The mechanism of light-induced conformational changes of chlorophyll-protein complexes exposing phosphorylation sites to the redox-controlled protein kinase. The mechanism of light-induced turnover of proteins of the photochemical reaction center of the oxygen evolving photosystem II complex.

Biochemical basis of disease:
Translocation of viral genome into virus infected cells: Construction of targeted vehicles. Development of novel anti-viral strategies. Iron metabolism in health and disease: regulation, membrane and intracellular transport, involvement in oxidative damage, role in diseases of systemic and regional iron accumulation. Novel methods for imaging iron in cells and assessing iron chelators as curative agents of iron toxicity. Biochemical and physiological analysis of the interaction of the malarial parasite and host erythrocytes. Fate of heme in malaria-infected erythrocytes. Redox metabolism in infected cells. Characterization of transport systems in malaria-infected erythrocytes.

Structure Biology:
Structural studies of avidin/streptavidin high affinity systems, catalytic properties of these proteins and avidin/streptavidin minimization by rational design. Signal transduction in cytokine receptors; structures of various complexes of cytokine hormones with cognate and non-cognate extracellular domains of receptors. Studies of inhibition or attenuation of cytoplasmic signaling in pathway by the CIS/JAB protein family. Rational and combinatorial approach for the design of weight control drugs via structural studies of FALBPs. Structural analysis of MAP kinases in their active in inactive forms. Structure function studies in neurotransmitters transporters. Analysis of bacterial multidrug transporters. Experimental and computational studies of viral ion channels. Infrared spectroscopy methods development. Molecular dynamics simulations of membrane proteins.

Bioinformatics:
Large scale studies of biological sequences and their structural and functional organization.

The Myers Skin Biochemistry Laboratory is engaged in control mechanisms and signaling of growth, differentiation, aging and apoptosis of epidermal and

dermal skin cells. Aging of skin cells-correlation to apoptotic signaling system. Cellular growth and differentiation of skin keratinocytes; studies of Pemphigus disease.

The Biotechnology & Fermentation Laboratory contains laboratory and pilot scale fermenters. It specializes in process development, development of strains of industrial microorganisms, production of cell mass, large-scale recombinant protein expression in E. coli and Pichia pastoris, production of fungal spores in submerged fermentation; downstream processing of microbial and fungal enzymes, immobilization of enzymes.

4.2.2 Cell and Animal Biology

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Benjamin	Aroeti	1994	6	6	265
Nissim	Ben-Arie	1998	7	6	645
Jeffrey Martin	Camhi	1982	2	14	
Marshall	Devor	1979	38	5	929
Amir	Eden	2003	7	4	
Uri	Gat	2000	8	5	905
Jacob	Hochman	1972	8	3	70
Eduardo N	Mitrani	1981	9	6	289

Forename	Surname	Grant income ($) since 2003	Patents since 1998	Awards & honors since 1998	Editorship
Benjamin	Aroeti	809,300	1		
Nissim	Ben-Arie	716,600		6	
Jeffrey Martin	Camhi				
Marshall	Devor	1,212,750	2	3	5
Amir	Eden	553,000			
Uri	Gat	580,000	1		
Jacob	Hochman	499,200	4	1	
Eduardo N	Mitrani	531,000	10	1	

The Department of Cell and Animal Biology began as the experimental branch of the Department of Zoology, one of the first departments of the Hebrew University of Jerusalem. The mission of the Department of Cell and Developmental Biology is to deepen our knowledge on fundamental questions in biology at the molecular, cellular and the intact organism level. The central objective of the Department is to advance our disciplines by combining efforts in both research and teaching.

The unifying concept of research, and therefore training, in the Department is the investigation of how cellular mechanisms serve larger scale, integrative functions such as the development and physiology of cells, tissues and functional systems. This interdisciplinary approach is served by faculty members whose individual specialties cover wide range of distinctive, yet complementary expertise.

Cell biologists in our faculty study subjects such as the dynamic regulation of intracellular trafficking, cell polarity, differentiation, epigenetic modifications, epithelial mesenchymal interactions, tumorigenesis and metastasis.

Developmental biologists in the department investigate differentiation of embryonic, adult and stem cells, morphogenesis of organ systems such as hair, skin and the nervous system, transcriptional and gene regulatory networks, adult stem cells and more.

Our system biologists focus on mechanisms of plasticity in the somatosensory system in mammals and neural mechanisms whereby injury provokes sensory dysfunction and chronic pain.

4.2.3 Evolution Systematics and Ecology

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Guy	Bloch	2001	15	5	370
Ariel D.	Chipman	2007	11	2	48
Amatzia	Genin	1987	25	1	199
Joseph	Heller	1975	15	1	83
Ronen	Kadmon	1994	19	8	
Salit	Kark	2003	23	2	182
Uzi	Motro	1982	15	33	19
Ran	Nathan	2003	42	1	1737
Guy	Sella	2006	3	7	77
Avishai	Shmida	1981	2	5	
Dan	Tchernov	2003	5	2	216

Forename	Surname	Grant income ($) since 2003	Patents since 1998	Awards & honors since 1998	Editorship
Guy	Bloch	1,225,000		3	
Ariel D.	Chipman	135,000			
Amatzia	Genin	3,526,000			3
Joseph	Heller	254,000			
Ronen	Kadmon	462,000			
Salit	Kark	582,000		2	2
Uzi	Motro	178,000		1	2
Ran	Nathan	1,180,000		2	3
Guy	Sella			2	
Avishai	Shmida	60,000			
Dan	Tchernov	782,000			

The Department of Evolution, Systematics and Ecology was established within the Silberman Institute of Life Sciences to promote modern research and teaching in the fields of Ecology and Evolutionary Biology. The unifying concept is the role of interactions among organisms and between organisms and their

environment, as factors that shape the evolution of living organisms and their distribution on earth. Research carried out at the department covers a wide spectrum of fields including animal behavior, micro- and macro-evolution, population and community ecology, landscape ecology, oceanography, conservation biology, systematic biology, and biogeography. Most research fields combine theoretical and experimental approaches and studies are conducted in both terrestrial and marine environments. The department's labs are equipped with advanced technologies for molecular analyses, experimental studies of animal behavior, geographical information systems, and remote sensing. The department houses the GIS Center of the Hebrew University and has a leading role in research and teaching carried out in the Heinz Steinitz Marine Biology Laboratory in Eilat.

4.2.4 Genetics

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Nissim	Benvenisty		36	16	1360
Michael	Brandeis	1997	9	8	446
Ariel	Darvasi	1999	31	18	1031
Michal	Goldberg	2004	5	1	1
Yosef	Gruenbaum	1985	35	25	1845
Joseph	Hirschberg	1984	9	17	1023
Batsheva	Kerem	1990	27	12	777
Eran	Meshorer	2007	18	6	438
Dudy	Tzfati	2002	9	10	146

Forename	Surname	Grant income ($) since 2003	Patents since 1998	Awards & honors since 1998	Editorship
Nissim	Benvenisty	5,049,500	3	2	5
Michael	Brandeis	961,000		1	1
Ariel	Darvasi	1,174,167		1	2
Michal	Goldberg	404,000			
Yosef	Gruenbaum	1,036,000		5	2
Joseph	Hirschberg	1,275,666	5	3	1
Batsheva	Kerem	1,743,000		2	1
Eran	Meshorer	280,000	2	8	1
Dudy	Tzfati	754,250			

Research in the Department of Genetics covers such areas as genetic regulation and cellular differentiation in eukaryotes; genetic control of cell-cycle; interactions between chromosomes and the nuclear envelope; regulation of gene expression in eukaryotes at the transcriptional and post-transcriptional level; effects of chromatin on the regulation of eukaryote gene expression; the role of RNA processing events on the regulation of gene expression; developmental, genetic and molecular analysis of complex characteristics in the nematodes, in chicken and in the mouse; human genetics; stem cell research; molecular analysis of oncogenesis; evolution and population genetics in humans, animals and plants;

molecular mapping of complex genomes; molecular analysis of photosynthesis; molecular biology of plants; improvement by genetic engineering of crop plants.

4.2.5 Neurobiology

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Binyamin	Hochner	2008	21	8	147
Shaul	Hochstein	1978	18	10	814
Yonatan	Loewenstein	2007	6	8	118
Adi	Mizrahi	2004	6	4	122
Israel	Nelken	2003	23	14	338
Idan	Segev*	1987			
Micha E	Spira*	1971			
Yosef	Yarom	1981	13	7	382
Ehud	Zohary	1994	15	18	584
Forename	**Surname**	**Grant income ($) since 2003**	**Patents since 1998**	**Awards & honors since 1998**	**Editorship**
Binyamin	Hochner	2,876,710			
Shaul	Hochstein	2,295,000		1	1
Yonatan	Loewenstein	110,000	2	2	1
Adi	Mizrahi	1,634,000	3	3	
Israel	Nelken	3,205,800	1	1	2
Idan	Segev*				
Micha E	Spira*				
Yosef	Yarom	955,000			1
Ehud	Zohary	844,000			

* Refused to supply data

The department of neurobiology includes nine faculty members working on diverse topics in neuroscience spanning the various levels of analysis of brain function from the molecular and cellular level, local circuits, to cortical columns, and a systems approach coupled with behavior. Enclosed is a list of the research interests of its faculty members:

Study of motor control in the flexible arm of the octopus in order to learn from nature how to solve the complex problems of motion control in highly redundant motor systems. Research incorporates behavioral, electro physiological and theoretical approaches.

Study of human and animal visual systems with special emphasis on the division of labor and interactions of various cortical visual processing pathways Studies the neural basis of decision making using theoretical modeling approaches Studies brain plasticity at single cell resolution. Our work concentrates on the niche of adult neurogenesis in the olfactory system of mice where we study structural and functional plasticity, in vivo.

Study of the coding of complex and behaviorally important sounds in the firing of single and small populations of auditory cortex neurons.

Development of theoretical and experimental tools for studying synaptic information processing and integration at the levels of the single nerve cell and small neuronal networks.
Use of a multidisciplinary approach to study the mechanisms underlying long-term neuronal and synaptic remodeling.
Study of the cellular, molecular and biophysical mechanisms underlying growth cone formation, navigation of neurites, target recognition, synapse formation and neuronal network construction in development, regeneration and simple forms of learning and memory processes. Involvment in the development of neuron-electronic hybrid systems.

Focus on cellular and network properties that underlie oscillatory phenomena within the brain. Two mammalian brain structures are studied: the cerebellum - a key structure in motor performance, and the suprachaismatic nucleus -the site of the circadian clock. Both structures display oscillatory activity that reflects cellular and network properties. Electro physiological, theoretical, morphological and imaging techniques are used.

Study of the human visual system, using functional neuroimaging (fMRI), transcranial magnetic stimulation (TMS) and behavioral techniques. Specific areas of interest include cortical reorganization in the human cortex, coordinate frames in the visual pathways, and the perception-action loop in vision.

4.2.6 Plant and Environmental Sciences

Forename	Surname	Year of first appointment in HUJI	Publications since 2003	Publications in HIF (≥4) journals since 1998	Citations of selected papers since 1998
Shimshon	Belkin	2003	16	5	152
Yehuda	Cohen*	1977			
Rachel	Green	2003	2	9	382
Aaron	Kaplan	1977	20	21	888
Nir	Keren	2005	2	8	125
Alex	Levine	1995	17		
Rachel	Nechushtai	1987	5	2	137
Aharon	Oren	1984	115	1	663
Anton	Post	1993	20	2	277
Forename	**Surname**	**Grant income ($) since 2003**	**Patents since 1998**	**Awards & honors since 1998**	**Editorship**
Shimshon	Belkin	1,135,000	4		4
Yehuda	Cohen*				
Rachel	Green	674,500		5	
Aaron	Kaplan	1,965,000	1		1
Nir	Keren	320,000			
Alex	Levine	223,000			
Rachel	Nechushtai	150,000			1
Aharon	Oren	643,200		1	5
Anton	Post				2

* Failed to supply data

The Department of Plant and Environmental Sciences was established in 2005 as a result of a merger between the Department of Plant Sciences (formerly the Department of Botany) and the Microbial Ecology Section of The Alexander Silberman Institute of Life Sciences.

Research in the department encompasses the physiology, biochemistry and molecular biology of higher plants, algae, cyanobacteria, halophilic bacteria and other microorganisms. Topics as seed germination, light responses; transport mechanisms; membrane biophysics; biogenesis of photosynthetic apparatus; import and processing of nuclear encoded chloroplast proteins; protein folding and cellular transport; structure-function relationships in electron transfer proteins like Fe-S proteins; molecular evolution; programmed cell death; plant-microbe interactions; oxidative stress in plants; signaling in plant-pathogen interactions; developmental physiology; factors determining photosynthetic efficiency; environmental stress; phytogeography; flora and microbiology of Israel and the Middle East; development of molecular sensors for monitoring water contaminants; formation of biofilm and biofouling in water treating systems; studies on transition and heavy metals in plants and bacteria.

4.3 Journal publications

Below we present a table of the total publications emanating from the Silberman Life Sciences Institute according to the different Journals ranked according to the journal impact factor. Taken together there have been 719 publications by members of the Silberman institute and slightly less than 30,000 citations.

Journal	Impact factor	Number of publications	Number of citations	Researchers
New England Journal of Medicine	52.589	1	103	1
Nat Rev Mol Cell Bio	31.92	3	283	2
Annu Rev Biochem	31.19	1	16	1
Cancer Letters	30.338	1	25	1
Cell	29.88	3	555	3
Nature	28.751	17	1277	13
Nat Med	26.38	1	0	1
Science	26.372	16	1462	14
Nat Genet	25.556	6	701	2
Nature Reviews Neuroscience	24.52	1	249	1
Cancer Cell	23.858	2	122	2
Nature Biotechnology	22.848	4	138	3
Nat Rev Genet	22.399	2	128	2
Annu Rev Plant Biol	18.712	1	248	1
Annu Rev Bioph Biom	17.757	1	42	1
Nat Cell Biol	17.62	1	9	1

Journal	Impact factor	Number of publications	Number of citations	Researchers
Journal of Clinical Investigation	16.915	1	13	1
Nature Neuroscience	15.664	10	491	4
J. Clinical Oncol.	15.484	1	33	1
Trends Biochem Sci	14.994	2	148	2
Trends Ecol Evol	14.797	9	388	3
Gene Dev	14.79	5	473	4
Trends Cell Biol	13.52	1	9	1
PLoS Biol	13.501	4	84	4
Curr Opin Cell Biol	13.44	1	28	1
Neuron	13.41	4	183	3
Circulation	12.755	2	36	2
TINS	12.479	1	134	1
Dev Cell	12.436	4	140	4
Genome Res	11.224	3	55	3
Am J Hum Genet	11.092	3	289	2
Nat Struct Mol Biol	11.08	3	246	2
Blood	10.986	15	460	1
MOLECULAR PSYCHIATRY	10.9	4	94	2
MOLECULAR PSYCHIATRY	10.9	1	43	1
Annu rev Ecol Evol S	10.34	1	90	1
Curr Biol	10.15	15	451	11
Curr Opin Struc Biol	10.15	1	3	1
Trends Genet	9.729	5	159	2
Plant Cell	9.65	5	311	4
PNAS	9.598	128	6022	60
J Cell biol	9.59	3	22	2
Trends Cogn Sci	9.389	1	66	1
FEMS Microbiol. Rev.	9.25	1	40	1
Curr Opin Plant Biol	9.189	1	137	1
Trends Plant Sci	8.995	1	51	1
current opinion in Neurobiology	8.958	2	55	2
Biol Rev	8.833	2	50	2
PLoS Genet	8.721	1	0	1

Journal	Impact factor	Number of publications	Number of citations	Researchers
EMBO J.	8.66	12	728	6
Brain	8.568	1	36	1
Hum Mol Genet	7.806	3	131	3
Cancer Research	7.672	2	15	1
Current Opinion Microbiol.	7.654	1	64	1
Ecol Lett	7.609	2	3	1
Stem Cells	7.53	6	148	1
J Neuroscience	7.49	58	1678	28
Curr. Opin. Biotechnol.	7.37	2	43	2
Development	7.293	4	229	2
Nucleic Acids Research	6.954	6	75	2
FASEB J	6.791	5	84	4
Plant J	6.751	7	276	5
Genome Biology (2008) impact 6.8 citations not yet available	6.589	1	0	1
Cerebral Cortex	6.519	10	152	4
Oncogene	6.44	11	505	5
Mol Cell Biol	6.42	16	587	9
Plant Physiol	6.367	13	256	6
PLoS Comput Biol	6.236	1	0	1
Mol Biol Cell	6.02	6	312	2
Neurology	6.014	2	100	2
RNA	5.84	1		1
RNA J.	5.84	1	3	1
Neurobiology of Aging	5.607	1	45	1
J Biol Chem	5.581	59	1415	21
Antioxid.Redox.Signal	5.484	1	13	1
MOLECULAR ENDOCRINOLOGY	5.33	5	101	1
Pain	5.249	7	502	1
Structure	5.2	1	10	1
Mol Ecol	5.169	3	23	2
Bioinformatics	5.039	7	100	3
Progress in Biophysics and Molecular Biology	5.009	1	50	1
J Cognitive Neuroscience	4.997	2	19	1

Journal	Impact factor	Number of publications	Number of citations	Researchers
Environmental Microbiology	4.929	4	17	1
J. Med. Chem	4.895	1	39	1
Chem. Mater.	4.883	1	11	1
Ecology	4.822	6	267	1
Free Radical Biology and Medicine	4.813	2	66	2
Biophys J	4.62	15	336	4
Am J Resp.Cell.Mol.Biol	4.608	1	48	1
J Physiology (Lond.)	4.58	1	32	1
The American Naturalist	4.543	3	28	1
Evolution	4.502	1	10	1
British J Hematol	4.49	1	12	1
Journal of Molecular Biology	4.472	5	71	2
J Neurochem	4.451	4	125	2
Molecular Cancer Research	4.317	1	1	1
J Ecology	4.23	9	115	2
Am. J. Physiol.-Lung Cell. Mol. Physiol	4.214	1	14	1
BioScience	4.083	1	28	1
J. Bacteriology	4.013	3	8	2
Biochemistry	4.009	6	166	3
Appl. Environ. Microbiol.	4.004	1	7	1
Applied and Environmental Microbiology	4.004	1	5	1
Totals:		628	25271	334

4.4 Total publications and patents

In appendix 1 we present the publications of members of the life sciences institute according to the individual researcher and departmental affiliations.

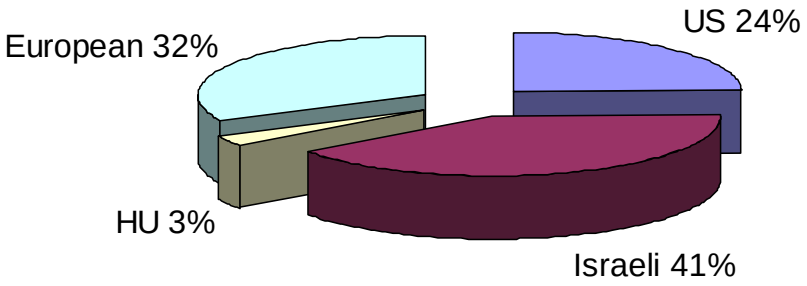
4.5 Grants and funding

Below we present a summery of the grants obtained by members of the Silberman Life Sciences Institute. The funding is broken down into internal and external grants. Furthermore, we provide a breakdown of the external grants according to geographical source.

As shown below, institute members receive the majority of their funding (97%) from competitive, international, external grants. Specifically, the biggest source of funding originates from Israeli sources, followed by European grants and thereafter from US sources. Taken together, this funding breakdown represents a balanced effort from a

multitude of funding sources. The grants of the Life Science Institute consist about 40% of the total income of the faculty from both competitive and non competitive sources.

GroupOfGrants	Total sum for grant period ($)	From year to year	Number of grant types
US sources (BSF, BARD, NIH, NSF, ICRF, Legacy, Juvenile diabetis, Prostate Cancer, CF etc)	13,976,574	2003-2013	26
Israeli (ISF, government ministries and other agencies)	23,183,930	2003-2012	25
HU internal grants for applied and other research	1,736,557	2003-2014	14
European (EU, GIF, DFG, DIP, NATO, etc)	18,286,238	2004-2011	18
Sum	57,183,299		83



4.6 Future direction of development

Our faculty members participate in scientific research at the highest international level. The vast majority of our publications are in international peer-review journals. We collaborate with numerous colleagues on campus, in Israel and overseas and we regularly travel to international meetings. Therefore our intimate view on the progression of biological scientific advance guides our recruitment.

How then can one plan for future breakthroughs, if by their very definition, they happen unexpectedly? While one can come up with a sophisticated plan for development we find that the best approach is as follows: (i) Train our students in the best possible way. (ii) Help them reach the leading labs in the world, which they invariably do. (iii) Attract the best of them back as independent researchers. In this route the newest technologies and avenues of research from the leading labs in the world are assimilated regularly in our very own institute.

While the first half of the 20th century was heralded as the "golden age of physics" the second half undoubtedly belongs to biology. Biological phenomena are now being studied at a level of sophistication that no one could have envisaged only a few decades ago. Amongst the "casualties" of the molecular biology revolution are the traditional disciplines that have fallen out of favor. The Silberman Life Sciences Institute has undergone a similar transition through the years that mirrors the revolution that the biological sciences have undergone. Thus traditional disciplines such as botany and zoology have made place for areas of a more molecular nature.

One of the future directions we plan is the foundation of a Brain Research Center. This center will include scientists from different disciplines and different faculties. Its goal is to create multidisciplinary environment for study of the brain from its molecules to its cognitive function. It will allocate sufficient resources to establish modern, sophisticated facilities that will serve the entire community. It will organize various graduate programs to cover all aspect of neurosciences and participate in the undergraduate teaching of neurobiology and physiology.

Chapter 5 - The Self-Evaluation Process, Summary and Conclusions

5.1. To what extent do the institution and the parent unit perform self-evaluation on a regular basis? (apart from the evaluation initiated by the Council for Higher Education). If self-evaluation is being performed – please describe and evaluate the way it is carried out and its frequency.

5.2. Has the institution appointed a senior staff member to deal with self-evaluation? If so, please state his name and his past and present position in the institution. State and evaluate the definition of his task as the staff member in charge of quality evaluation in the institution, including the scope of his authority and his method of operation.

The Hebrew University initiated a systematic process of Review and evaluation of all its units at regular intervals (usually each unit is evaluated every 5-7 years). The review process relies on external committees consisting of internationally renowned experts in the reviewed field from leading universities abroad. The mandate of the Committees, as stated in the nomination letter, is to evaluate the unit's academic performance in teaching and research, and its standing within the field, in Israel and internationally. The committees are asked to identify areas of strength and weakness and to advise the University on ways to improve and develop the unit. To achieve that goal committees examine all aspects of the reviewed unit: the activity of faculty members in both research and teaching, curricula, students' level, infrastructure, and administrative functions.

The Vice-Rector, Professor Miri Gur-Arye, is responsible for the academic evaluations at the Hebrew University. Assisting the Vice-Rector since June 2005 are two Heads of Academic Review, Prof. Kobi Metzer as Head of Academic Review in the Humanities, Social Sciences and Law; and Prof. Eli Friedman as Head of Academic Review in the Sciences. Both have served as Deans of large faculties (Social Sciences and Mathematics and Natural Sciences, respectively).

The "team" of the academic review at the Hebrew University coordinates the whole process of the review, which begins with the appointment of the Committee members, and the preparation of material by the reviewed unit. Preparing the material for the Review Committee gives the unit an opportunity for self-assessment, itself an important stage in the review. The Committee then convenes in Jerusalem for approximately a week, in which the Committee members get access to all relevant material and meet with staff, faculty and students. The Committee's report is submitted to the Rector, and its recommendations are carefully studied by the University adminsitration (The President, the Rector, the Vice-Rector and the two Heads of the Academic Review). The reviewed unit is asked to prepare a response, which is brought, together with the report of the review committee, before the University's Committee for Academic Policy. This Committee, chaired by the President and the Rector, discusses all the relevant matters and decides on implementing all, or parts, of the recommendations.

5.3. What are the conclusions of the parent unit and the study program from the self-evaluation activity with regard both to the way it was performed and to its results? Has it shed light on issues that were in need of treatment/improvement and has it eventually contributed to the improvement of the program?

For the teaching program this self evaluation process was an arduous, but interesting experience. The process was composed of three parts – generating the tools for collecting the vast amount of data, collecting, or rather extracting (occasionally forcefully), the data from the senior staff and finally compiling and presenting our findings in this report. The general attitude to evaluation committees and reports are sceptical. The major reason to this scepticism is the widespread doubt that the recommendations of the evaluation committee will be implemented in a way that will lead to a noticeable change or improvement. We, the authors of this report, though being far from naïve, did every effort to present a comprehensive and honest report dealing with our strengths and weaknesses and with problems we believe must be addressed. We do hope that some of these will find a solution and that this report will serve as an agent for change. We might have failed to convince our fellow staff of the importance of the report. This might be also due to the fact that this report coincided with other cross sectional evaluation reports creating an exaggerated load. One of the most pleasant surprises was the serious and thorough proofreading our report got from the highest authorities of the university – the Dean, Prof. Gad Marom; the Head of academic review, Prof. Eli Friedman; the Vice-Rector, Prof. Miri Gur-Arye and the Rector Prof. Sara Strumsa. This serious attitude on its own and the fact that our program has been presented to these authorities made this considerable effort worthwhile.

5.4. If a mechanism/structure has been decided upon for the future treatment of problematic issues that were highlighted by the self-evaluation activity, specify it while referring to the functionary within the institution who would be responsible to follow-up on this activity. Please refer to the question how does the institution and the parent unit intend to deal in the future with the quality assessment and its implementation?

5.5. Are the results of the self-evaluation open, transparent and accessible to staff (academic as well as administrative) and students?

The Hebrew University regards transparency and accessibility of evaluation reports as essential to the usefulness of the self-evaluation process. Following the discussion by the committee for academic policy (see above), the reports are made public and posted on the University's website.

A more detailed account of some of these points has already been outlined in the introduction to this report.

Chapter 6

Appendices

(* Appendices will appear in the <u>body</u> of the report)

6.1 The Study Program - Table no. 1

Academic Year of Evaluation* - _(2008)

BSc

Basic studies (for all tracks):

Year	Semester	Course number	Course title	Course type (Obligatory./Elective/ seminar/other)	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
1	1st	69174	GENERAL CHEMISTRY FOR BIOLOGY STUDENTS	Obligatory	6	0	4	2	0		Shenhar Roy	
1	1st	77148	GENERAL PHYSICS - MECHANICS - FOR BIOLOGY STUD	Obligatory	5	0	4	1	0		Orgad Dror	
1	1st	80125	CALCULUS FOR SCIENCE STUDENTS	Obligatory	4	0	4	0	0		Avigdor Bar-yoda Yaacov Etin	
1	2nd	69123	PHYSICAL CHEMISTRY FOR BIOLOGY STUDENTS	Obligatory	5	0	4	2	0		Noam Agmon	
1	2nd	69173	GENERAL CHEMISTRY LAB FOR BIOLOGY STUDENTS	Obligatory	3	0	0	0	5		Gil Shoham	
1	2nd	77304	GENERAL PHYS: ELECT & OPTICS FOR BIOLOGY STUD.)	Obligatory	5	0	4	1	0		Natalie Balaban	

Introductory and advanced inotrductory courses for all tracks (see footnotes)

Year	Semester	Course number	Course title	Course type (Obligatory./Elective/ seminar/other)	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
1	1st	72109	From Cell to Organism	Obligatory	4		4	0	0	250	Tchernov Dan Aroeti Benjamin	Lecturer Senior Lecturer
1	1st	72110	From Cell to Organism	Obligatory	3		0	0	3	166	Chipman Ariel	Senior Lecturer
1	1st	72157	Biochemistry of the Cell - Lab	Elective	5		0	0	5	23	Orly Joseph	Professor
1	2nd	72121	Biochemistry of the Cell	Obligatory	6		4	2	0	242	Engelberg David Livnah Oded, Schuldiner Shimon	Assoc. Professor Assoc. Professor Professor
1	2nd	72155	General Genetics A	Obligatory	5.5		3	1	1.5	266	Richler Carmelit Gruenbaum Yosef Brandeis Michael	Research associate (Ph.D) Professor Assoc. Professor
1	2nd	72301	Fundamentals of Probability & Statistical Analysis	Obligatory	4		3	1	0	194	Darvasi Ariel	Assoc. Professor
2	1st	72107	Introduction to Ecology and Population Biology	Obligatory[1]	5		4	1	0	163	Genin Amatzia Cohen Dan	Professor Professor Emer.
2	1st	72332	Introduction to Molecular Biology	Obligatory	5		3	2	0	272	Soreq Hemona Shlomai Yosef, Engelberg David	Professor Professor Assoc. Professor
2	1st	72334	Introduction for Plant Science	Obligatory[1]	4		3	0	2	119	Keren Nir Kaplan Aaron	Senior Lecturer Professor

Year	Semester	Course number	Course title	Course type (Obligatory./Elective/ seminar/other)	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2	1st	72335	Introduction to Microbiology	Obligatory[1]	5	0	4	0	1.5	105	Panet Amos Cohen Yehuda, Yefe Nof Eitan, Rotem Shlomo, Oren Aharon	Professor Assoc. Professor Professor Professor Professor
2	1st	72336	Introduction to Physiology	Obligatory[1]	5	course 77131 or 77304	4	1	1	154	Segev Idan Mizrahi Adi	Professor Senior Lecturer
2,3	2nd	72342	Microbiology: Advanced Level	Elective[1]	5	course 72335 or 72362	5	0	0	127	Jaffe Charles Rosen Haim Banyash Michal Cohen Yehuda Tarablus Albert	Professor Professor Professor Assoc. Professor Professor
2,3	2nd	72373	Introduction to Cell Biology	Elective[1]	4	Choose 72105 or 72106 or 72108	4	1	0	75	Spira Micha Aroeti Benjamin Gruenbaum Yosef Brandeis Michael	Professor Senior Lecturer Professor Assoc. Professor
2,3	2nd	72339	Biochemistry: Advanced Level	Elective[1]	6	course 72120 or 72121	4	1	2	83	Atlas Daphne Arkin Isaia	Professor Professor
2,3	2nd	72343	Physiology: Advanced Level	Elective[2]	5	course 72336 or 72363	4	1	0	82	Nelken Israel Devor Marshall	Professor Professor
2,3	2nd	72346	Plant Physiology and Biochemistry	Elective[2]	5	0	2	0	3	26	Nechushtai Rachel Green Rachel	Professor Senior Lecturer
2,3	2nd	72351	Workshop in Bioinformatics	Elective[1]	4	course 72120 or 72121 and also course 72155 or 72332	0	4	0	24	Linal Michal Doron Nurit	Professor Research associate (Ph.D)
2,3	2nd	72604	Ecology Advanced	Elective[2]	5	0	4	1	1 field trip	65	Kadmon Ronen Nathan Ran	Professor Assoc. Professor

Year	Semester	Course number	Course title	Course type (Obligatory./Elective/ seminar/other)	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2,3	2nd	72693	Evolution	Elective[2]	4	course 72155 or72156	2	2	0	29	Sella Guy	Lecturer
3	2nd	72520	Undergraduate Seminar: Evolution, Systematics, Ecology & Behavior	Elective[3]	2	0	2	0	0	14	Kark Salit	Senior Lecturer
3	2nd	72521	Undergraduate Seminar: Genetics	Elective[3]	2	0	2	0	0	14	Kerem Batsheva	Professor
3	2nd	72522	Undergraduate Seminar: Cellular and Molecular Biology	Elective[3]	2	0	2	0	0	13	Hochman Jacob	Professor
3	2nd	72524	Undergraduate Seminar: Plant Sciences	Elective[3]	2	0	2	0	0	20	Nechushtai Rachel	Professor
3	2nd	72525	Seminr: Structural & Molecular Biochemistry	Elective[3]	2	0	2	0	0	17	Livnah Oded	Assoc. Professor
3	2nd	72526	Undergraduate Seminar: Brain & Behavior Sciences	Elective[3]	2	0	2	0	0	9	Hochtstein Shaul	Professor
3	2nd	72527	Undergraduate Seminar:Molecular Microbiology	Elective[3]	2	0	2	0	0	33	Jarrous Nayef Gonaser Jacob, Mandelboim Ofer	Senior Lecturer Senior Lecturer Assoc. Professor

Obligatory[1] - Obligatory to Single Major students
Dual Major students have to take 2 out of these courses
Elective[1] – Single Major students have to take 3 out of these courses.
Dual Major students have to take 2 out of these courses.
Elective[2] – Single Major students have to take 2 out of these courses.
Dual Major students have to take 1 out of these courses.
Elective[3] – All students (except Etgar) have to chose one of these seminars.

Etgar program (in addition to single or dual major requirements)

year	Semester	Course number	Course title	Course type (Obligatory./Elective/ seminar/other)	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
1	1st	72157	Biochemistry of the Cell - Lab	Obligatory	5	0	0	0	5	23	Orly Joseph	Professor
1	2nd	72131	Genetics Lab – Etgar program	Obligatory	3.5	0	3	0	1.5	16	Benvenisty Nissim	Professor
1	All year	72140	Etgar year 1 tutoring course	Obligatory	4	0	0	0	Personal tutoring	19	Mitrani Eduardo	Professor
2	All Year	72390	Etgar Seminar	Obligatory	4	0	0	0	0	8	Sella Guy Mitrani Eduardo	Lecturer professor
3	All Year	72327	Guide Project in Biological Research – Honor's Program	Obligatory	5	0	0	0	Individual projects	3	Mitrani Eduardo	Professor

Elective courses for all BSc tracks

year	Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2,3	1st	72585	Animal Behavior	3	0	3	0	0	127	Bloch Guy	Assoc. Professor
2,3	1st	72350	Human Genetics	3	course 72345	2	1	0	65	Benvenisty Nissim Kerem Batsheva	Professor Professor
2,3	1st	72614	General Endocrinology	3	course 72120 or 72121	3	0	0	50	Orly Joseph Hochman Jacob	Professor Professor
2,3	1st	72616	Introduction to Biotechnology	2	0	2	0	0	73	Hirschberg Joseph Ginsburg Hagai Belkin Shimshon	Professor Professor Emer. Professor
2,3	1st	72674	Protein Folding	3	0	3	0	0	11	Shifman Yulia	Lecturer
2,3	2nd	72359	Biology of Fungi	3	0	3	0	0	13	Polcheck Itzhak	Professor
2,3	2nd	72369	Introduction to Neurobiology	5	course 72336 or 72363	5	1	4	104	Yarom Yosef Spira Micha	Professor Professor
2,3	2nd	72653	An Insight Into Plant Development	2	course 72334	2	0	0	70	Green Rachel	Senior Lecturer
3	1st	72352	Differentiation Mechanisms and Cancer Transformation	2	0	2	0	0	98	Keshet Eli Benvenisty Nissim Ben-Neria Yinon	Professor Professor Professor
3	1st	72501	Microbial Ecology	4	course 72335	4	0	0	10	Oren Aharon Cohen Yehuda	Professor Assoc. Professor
3	1st	72600	Biochemistry and Physiology of Photosynthesis	5	0	1	0	4	13	Nechushtai Rachel Hirschberg Joseph, Ohad Itzhak Kaplan Aaron Keren Nir, Tchernov Dan	Professor Professor Professor Emer. Professor Senior Lecturer Lecturer
3	1st	72605	Vegetatation and Flora of Israel	3	0	3	0	0	38	Uri Fragman-Sapir	External lecturer

year	Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
3	1st	72625	Neural Mechanisms of Animal Behavior	4	0	4	0	0	41	Devor Marshall Zohary Ehud	Professor Assoc. Professor
3	1st	72633	Topics in Neurobiology	4	course 72369	3	1	0	45	Mizrahi Adi Hochstein Shaul	Senior Lecturer Professor
3	1st	72637	Plant Environment: Physiology and Molecular Biology	2	0	2	0	0	22	Levine Alex	Assoc. Professor
3	1st	72639	Plants in the Service of Man	3	0	3	0	included in class	29	Plitmann Uzi	Professor Emer.
3	1st	72664	Molecular Biology of Bacteria and Bacteriophages	2	0	2	0	0	65	Engelberg Kulka Hanna	Professor
3	1st	72665	Immunology	3	course 72342	3	0	0	78	Banyash Michal Naor David Mandelboim Ofer	Professor Professor Assoc. Professor
3	1st	72669	Molecular Biology of Viruses	2	0	4	0	0	84	Mitrani Stella Kottler Moshe	Professor Professor
3	1st	72667	Bioinformatics-Computerized Analysis of Biological Seq	3	0	3	included in class	0	36	Furman Ora	Senior Lecturer
3	1st	72679	Applied Microbiology	5	0	5	0	0	12	Goldberg Israel Rokem Stephan	Professor Professor
3	1st	72683	Molecular Genetics of Eukaryotes	2	0	2	0	0	57	Goldberg Michal	Lecturer
3	1st	72707	Molecular and Cellular Physiology of Microgorganisms	5	0	5	0	0	25	Amster-Choder Orna Pines Ofri Goldberg Israel, Altuvia Shoshana Rosenshine Ilan	Professor Professor Professor Professor Professor
3	1st	72745	Molecular Biology As a basis for Gene Therapy	3	0	3	0	0	28	Honigman Alexander, Rosen Haim	Professor Professor
3	1st	76724	Marine	6	0	condensed	0	0	4	Tchernov Dan	Lecturer

year	Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
			Photosynthesis								
3	2nd	72320	Processes in Embryonic Development	5	Course 72105 or 72106 or 72108 **and also** course 72332	4	1	0	72	Ben Arie Nissim Mitrani Eduardo	Senior Lecturer Assoc. Professor
3	2nd	72510	Recombinant as a Tool in Biology Research	6	0	6	0	included in class	8	Orly Joseph Padan Etana Tzfati Yehuda, Linial Michal	Professor Professor Emer. Senior Lecturer Professor
3	2nd	72550	Ecology of Pollination	3	0	3	0	0	122	Shmida Avishai	Professor
3	2nd	72587	Plant-Pathogen Relationships	3	0	3	0	0	44	Levine Alex	Assoc. Professor
3	2nd	72707	Genetic Engineering of Bacterial and Phages	6.5	0	6	0	0	12	Altuvia Shoshy Rosenshine Ilan	Professor Professor
3	2nd	72646	Fish Fauna of Israel	4.5	0	3	0	included in class	22	Golani Dani	Research associate (Ph.D)
3	2nd	72651	Molecular Biology of Animal Cells	3	0	3	0	0	37	Kampfer, Raymond Jarrous Nayef	Professor Senior Lecturer
3	2nd	72672	The Biology of the Human Parasites and their Arthropod Vectors	5	0	5	0	0	6	Varburg Alon Jaffe Charles	Lecturer Professor
3	2nd	87613	Darwinism	2	0	2	0	0	63	Harman Oren	External lecturer
3	All Year	72329	Guided Project in Biological Research	5	0	0	0	0	17	Gruenbaum Yosef	Professor
3	All Year	72623	Evolution and Ecology of Birds	5	0	5	0	Field trips	23	Nathan Ran	Assoc. Professor
3	2nd	76705	Marine Animal Behavior	6	0	condensed			8	Shashar Nadav Katzir Gad	Senior Lecturer Professor Emer.
3	2nd	76716	Marine Microbiology	7	0	condensed			12	Oren Aharon Belkin Shimshon	Professor Professor

year	Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
3	2nd	76719	Red-Sea Fish-Workshop	4	0	condensed			3	Avi Baranes	Professor
3	2nd	76728	In Vivo Intracellular Recordings	6	0	condensed			2	Yarom Yosoef	Professor

Graduate courses (MSc and PhD)

Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2nd	92620	Biochemistry and Physiology of Membrane Proteins	3	0	3	0	0	21	Schuldiner, Shimon Kaner Baruch Stern-Bach Yael Arkin Isaia	Professor Professor Senior Lecturer Professor
2nd	76705	Marine Animal Behavior	6	0	condensed			8	Shashar Nadav Katzir Gad	Senior Lecturer Professor Emer.
2nd	76716	Marine Microbiology	7	0	condensed			12	Oren Aharon Belkin Shimshon	Professor Professor
2nd	76719	Red-Sea Fish-Workshop	4	0	condensed			3	Avi Baranes	Professor
2nd	76728	In Vivo Intracellular Recordings	6	0	condensed			2	Yarom Yosoef	Professor
1st	78891	Theory and Art of the processing of neural signals	2	0	2	0	0	2	Nelken Israel	Professor
1st	86895	Educational and Science Aspects of Nature Connection	2	0	2	0	0	5	Camhi Jeff	Professor
1st	86825	Structure and Function of the Mammalian Brain	4	0	4	0	0	23	Devor Marshall	Professor
1st	88843	Molecular Biology of Upper Plants	3	0	3	0	0	13	Hirschberg Joseph Mann Varda	Professor Research associate (Ph.D)
1st	88890	Graduate Seminar in Genetics	2	0	2	0	0	8	Goldberg Michal	Lecturer
1st	90803	Advanced Readings in Molecular Evolution	2	0	2	0	0	3	Sella Guy	Lecturer
1st	92812	Separation Methods in Biochemistry	4	0	2	2	0	15	Milner Yoram	Assoc. Professor Emer.

Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2nd	78818	Selected Topics in Cerebellum Research	3	0	3	0	0	3	Yarom Yosef	Professor
2nd	78844	Geaduate Seminar in Brain Sciences and Behavior	2	0	2	0	0	6	Nelken Israel	Professor
2nd	86875	Selected Topics in Protein Targeting and Cell Cycle	2	0	2	0	0	2	Aroeti Benjamin Brandeis Michael	Senior Lecturer Assoc. Professor
2nd	86895	Advanced Lab in Developmental Biology	3	0	3	0	included in class	2	Mitrani Eduardo	Assoc. Professor
2nd	88825	Human Molecular Genetics	3	0	3	0	0	15	Kerem Batsheva Levi-Lahad Efrat	Professor
2nd	90110	Ecology of Pollination in MeironMountain	3	0	condensed	0	0	18	Shmida Avishai	Professor
2nd	90820	Ecology of Nature Peservation	5	0	3	2	0	2	Kark Salit	Senior Lecturer
2nd	90830	Plancton	4	0	condensed	0	0	6	Genin Amatzia Prestei Bracha	Professor Senior Lecturer
2nd	92635	A Practical Course for Structural Protein NMR	4	0	condensed	0	0	3	Shalev Devorah Livnah Oded	Research associate (Ph.D) Assoc. Professor
2nd	92623	Protein Design and Evolution	3	0	3	0	0	7	Shifman Yulia	Lecturer
2nd	92808	Analysis of Scientific Papers	2	0	2	0	0	6	All program teahcers	
2nd	92842	Molcular Processes in the Brain	2	0	2	0	0	32	Soreq Hermona Linial Michal	Professor Professor
2nd	92849	Structural Analysis of Protein Structures	4	0	condensed	0	0	11	Livnah Oded	Assoc. Professor
2nd	92893	Chromosome Structure and Regulation of DNA Transcription	2	0	condensed	0	0	16	Kornberg Roger	Professor

Semester	Course number	Course title	No. of Credits	Preerquisites for admission	Weekly Teaching Hrs.	Weekly Exercise Hrs	Weekly Lab. Hrs	No. of Students	Name of Staff Members	Status
2nd	92984	From Transgene to Protein	6	0	condensed	0	included in class	16	Soreq Hermona	Professor
2nd	92985	Topics in Transgene Engineering	2	0	condensed	0	0	3	Soreq Hermona	Professor
2nd	93817	Physiology and Molecular Biology of Plants	2	0	2	0	0	5	Green Rachel Reinhold Leonora	Senior Lecturer Professor Emer.
2nd	93856	Integration of genomes, organelles, biochemical pathways and physiological response	4	0	4	0	0	4	Kaplan Aaron Keren Nir, Mayer Avraham	Professor Senior Lecturer Professor Emer.
2nd	93852	Seminar in Plant sciences	2	0	2	0	0	4	Nechushtai Rachel	Professor
2nd	93857	Topics in Plant Physiology	4	0	4	0	0	3	Lerner Tzvi	Senior Lecturer Emer.
condenced	76880	Functional Genomics	2	0	condensed	condensed	condensed	11	Benvenisty Nissim	Professor
All Year	86890	Graduate Seminar in Zoology	2	0	2	0	0	3	Eden Amir	Lecturer
All Year	88830	Genetics Research Labs	3	0	condensed	0	0	2	All program teahcers	
All Year	90604	Topics in Ecology-Undergraduate Seminar	2	0	2	0	0	11	Genin Amatzia	Professor
All Year	90610	Scientific Approaches in Ecology	6	0	condensed	0	0	5	Genin Amatzia Kiflawi Moshe	Professor Professor
All Year	90710	Research Approaches in Ecology	6	0	4	2	0	2	Kadmon Ronen	Professor
All Year	92981	Research Seminar in Biochemistry	2	0	2	0	0	16	Atlas Daphne	Professor

Table 6.2A
Senior Academic Staff Employed

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
Arkin Isaiah	Prof.		Biological Chemistry	Membrane protein structural biology	72812 - Biochemistry and Physiology of Membrane Proteins (3)	3	4	0.7
				Molecular dynamics simulations	72120 - Biochemistry of the Cell (6)	6	2	3
				fTIR spectroscopy	72339 - Biochemistry: Advanced Level (4)	4	2	2
Atlas Daphne	Prof.	**Family & First name**	**Name of Staff Member**	Use of a novel redox cluster strategy for the treatment of diabates and allergy	92981 - Research Seminar in Biochemistry (2)	2	1	2
				The mechanism of transmitter release	72339 - Biochemistry: Advanced Level (4)	4	2	2
				Use of antioxidnats for the treatment of Parkinson's and alzheimer's diseases	72338 - Biochemistry: Advanced Level (2)	4	1	4
				Development of novel compounds for the treatment of neurodegenerative diseases				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
				The mechanism of autism related disorders				
Cabantchik Zvi Ioav	Prof.		Biological Chemistry	Iron metabolism	72120 - Biochemistry of the Cell (6)	6	2	3
				Membrane transport				
				Fluorescence				
Engelberg David	Assoc. Prof.		Biological Chemistry	Molecular/directed evolution	72121 - Biochemistry of the Cell (6)	8	3	2.6
				MAP kinases, stress kinases	72332 - Introduction to Molecular Biology (5)	5	3	1.6
				Signal transduction				
				Gene expression, Gcn4, Msn2/4, HSF, HSP104				
Levitzki Alexander	Prof.		Biological Chemistry	Development of novel protein kinase inhibitors				
				Development of EGFR targeted dsRNA to metastatic tumors over-expressing EGFR				
				Novel anti-inflammatory agents				
				The continuous transformation of keratinocytes				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				The role of the proteasome subunit S5a in apoptosis				
Linial Michal	Prof.	Director of academic Institute. (Over 2 hrs up to 5 hrs)	Biological Chemistry	Proteomics technology	92842 - Molecular Processes in the Brain (2)	2	2	1
				Regulation of secretion	72510 - Recombinant as a Tool in Biology Research (6)	6	4	1.
				Synaptic function	72351 - Workshop in Bioinformatics (3)	3	2	1.
				Bioinformatics and Computational Biology				
				Systems biology and Protein family classifications				
Livnah Oded	Assoc. Prof.		Biological Chemistry	Structural determination of biologically related macromolecules via X-ray crystallographic techniques.	92619 - A Practical Course for Structural Protein NMR (4)	Short intense course	2	
				Ligand recognition, initial signaling events, and the role of dimer/oligomer orientation in cytokine receptor systems.	92849 - Structural Analysis of Protein Structures (4)	Short intense course	1	
				Structural studies of avidin/streptavidin - biotin high affinity systems.	72121 - Biochemistry	8	3	2.6

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
					of the Cell (6)			
				Structural based drug design and optimization. Combinatorial approaches in drug discovery.	72525 - Seminar: Structural & Molecular Biochemistry (2)	2	1	2
Orly Joseph	Prof.		Biological Chemistry	Involvement of steriodogenic proteins in apoptosis:cancer & heart failure models	72157 - Biochemistry of the Cell - Lab (5)	10	1	1
				Mechanism of protein degradation in the mitochondria: steriodogenic cell model	72614 - General Endocrinology (3)	3	2	1.
				Transcriptional regulation of steroidogenic genes in the ovary and placenta	72510 - Recombinant as a Tool in Biology Research (6)	6	4	1.
Ravid Tommer	Senior Lecturer (Ph.D)		Biological Chemistry	Enzymatic reactions of ubiquitin-chain formation and transfer				
				Mechanisms of endoplasmic reticulum-associated protein degradation				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Regulation of lipids synthesis, storage, and transport by ubiquitin				
				intracellular pathways for protein quality control;				
Schuldiner Shimon	Prof.		Biological Chemistry	Membrane Protein Biochemistry	72812 - Biochemistry and Physiology of Membrane Proteins (3)	3	4	0.7
				Multidrug transporters	72121 - Biochemistry of the Cell (6)	8	3	2.6
				Ion-coupled transporters: structure and function				
				Neurotransmitter transporters				
				Multidrug resistance				
Julia	Lecturer (Ph.D)		Biological Chemistry	Structural biology	72674 - Protein Folding (3)	3	1	3
				Protein-protein interactions	92623 - Protein Design and Evolution (3)	3	1	3
				Computational and experimental protein design				
Soreq Hermona	Prof.		Biological Chemistry	Stress Responses	92842 - Molecular Processes in the Brain (2)	2	2	1
				Acetylcholinesterase Biology	92985 - Topics in Transgene	Short intense	1	

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
					Engineering (2)	course		
				Antisense Technology	92984 - From Transgene to Protein (6)	Short intense course	1	
				Molecular Medicine	72332 - Introduction to Molecular Biology (5)	5	3	1.6
				Molecular Neurobiology				
Aroeti Benjamin	Senior Lecturer (Ph.D)	Academic Institute - ???	Cell and animal Biology	Pathogen-cell interactions	86875 - Selected Topics in Protein Targeting and Cell Cycle (2)	2	2	1
				Cell biology	72373 - Introduction to Cell Biology (5)	6	4	1.
				Polarized cells	72109 - From Cell to Organism (4)	4	2	2
				Membrane traffic				
Ben-Arie Nissim	Senior Lecturer (Ph.D)		Cell and animal Biology	Development of the nervous system	72320 - Processes in Embryonic Development (5)	5	2	2.
				Genetics				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hrs Teac
				Transcription facotrs				
Camhi Jeffrey Martin	Prof.		Cell and animal Biology	Neuroethology: Nerve cells and the behavior of animals	72108 - From Cell to Organism (4)	4	2	2
				Museology: Visitor studies research	86839 - Educational and Science Aspects of Nature Connection (2)	2	1	2
Devor Marshall	Prof.		Cell and animal Biology	Pain mechanisms	72625 - Neural Mechanisms of Animal Behavior (4)	4	2	2
				Anesthesia and anesthesia-like states	72349 - Lab in Brain & Behavior for Psychobiology Students (3)	Short intense course	4	
					72348 - Guide Projects in Biology Research for Psychobiology (5)	5	1	5

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
					72539 - Undergraduate Research Seminar in Psychobiology (2)	2	1	2
					86892 - Structure and Function of the Mammalian Brain (4)	4	1	4
					72343 - Physiology: Advanced Level (5)	5	2	2.
Eden Amir	Lecturer (Ph.D)		Cell and animal Biology	DNA methylation	72108 - From Cell to Organism (4)	4	2	2
				Epigenetics	86890 - Graduate Seminar in Zoology (2)	2	1	2
				Genetics				
				Cancer				
				Chromatin				
Gat Uri	Senior Lecturer (Ph.D)		Cell and animal Biology	The role of Runx factors in hair development				
				Structure and production of spider silk proteins				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hrs Teac
				Evolutionary origin of the Runx genes in the sea-anemone Nematostella				
				Developmental Biology of hair and skin				
				Transcriptional regulation of hair keratins				
Hochman Jacob	Prof.		Cell and animal Biology	Anti-Cancer characteristics of Cranberry constituents	72614 - General Endocrinology (3)	3	2	1.
				Metastasis of malignant lymphoma to the brain and eyes	72522 - Undergraduate Seminar: Cellular and Molecular Biology (2)	2	1	2
				Mouse Mammary Tumor Virus nucleolar p14: From mouse lymphoma to breast cancer				
				Reversal of Multi-drug resistance in cancer				
				Xenogenization of malignant lymphoma				
Mitrani Eduardo N	Assoc. Prof.	Consultant in industry (Up to 2 hrs) Academic Institute Director in industry.	Cell and animal Biology	Cell differentiation	72390 - Guide Seminar - Honor's Program (4)	4	2	2
				Epithelial mesenchymal interactions	72140 - Guide Seminar - Honor's Program (4)	4	1	4
				Stem cell differentiation into beta cells	86895 - Advanced Lab	3	1	3

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hrs Teac
		(Over 2 hrs up to 5 hrs)			in Developmental Biology (3)			
				Artificial organs	72327 - Guide Project in Biological Research- Honor's Program (5)	Annual project	1	
					72320 - Processes in Embryonic Development (5)	5	2	2.
Bloch Guy	Assoc. Prof.		Evolution Systematics & Ecology	Mechanisms and evolution of complex behavior in bees	72586 - Animal Behavior (3)	3	1	3
				Sociobiology				
				chronobiology				
Chipman Ariel D.	Senior Lecturer (Ph.D)		Evolution Systematics & Ecology	Evolution of animal body plans	72110 - From Cell to Organism (3)	3	1	3
				Invertebrate evolution and diversity				
				Evolutionary Developmental Biology (evo-devo)				
Genin Amatzia	Prof.		Evolution Systematics & Ecology	Plankton ecology	72107 - Introduction to Ecology and Population	5	2	2.

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
					Biology (5)			
				Coral reef ecology	90604 - Topics in Ecology- Undergraduate Seminar (2)	2	1	2
				Biological oceanography	90610 - Scientific Approaches in Ecology (6)	Short intense course	2	
					90830 - Plancton (4)	Short intense course	1	
Heller Joseph	Assoc. Prof.		Evolution Systematics & Ecology	Ecology				
				Systematics				
				Evolution				
				Molluscs				
Kadmon Ronen	Prof.		Evolution Systematics & Ecology	Ecology	72604 - Ecology Advanced (5)	5	2	2.
					90710 - Research Approaches in Ecology (6)	6	1	6
Kark Salit	Senior Lecturer (Ph.D)		Evolution Systematics & Ecology	Urban ecology	90820 - Ecology of Nature Preservation (5)	5	1	5

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Biodiversity science	72520 - Undergraduate Seminar: Evolution, Systematics, Ecology & Behavior (2)	2	1	2
				Ecology				
				Global change biology				
				Invasion biology				
Motro Uzi	Prof.		Evolution Systematics & Ecology	Theoretical population biology				
				Statistical aspects of forensic DNA identification				
				Game-theory models for understanding the evolution of social behavior				
Nathan Ran	Assoc. Prof.	Member of Directory board, Up to 2 hrs	Evolution Systematics & Ecology	Dispersal	72623 - Evolution and Ecology of Birds (5)	5	1	5
				Foraging	72604 - Ecology Advanced (5)	5	2	2.
				Migration				
				Movement ecology				
				Ecological modeling				
Sella Guy	Lecturer (Ph.D)		Evolution Systematics & Ecology	Molecular evolution	72390 - Guide Seminar - Honor's Program (4)	4	2	2
					72693 - Evolution (4)	4	1	4

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hrs Teac
					90803 - Advanced Readings in Molecular Evolution (2)	2	1	2
Shmida Avishai	Prof.		Evolution Systematics & Ecology	Game-Theory	90110 - Ecology of Pollination in Meiron Mountain (3)	Short intense course	1	
				Biology	72550 - Ecology of Pollination (3)	3	1	3
				Environment				
				Ecology Evolution				
Tchernov Dan	Lecturer (Ph.D)		Evolution Systematics & Ecology	Paleo climate reconstruction	76724 - Marine Photosynthesis (6)	Short intense course	1	
				Coral Biology	72109 - From Cell to Organism (4)	4	2	2
				Marine photosynthesis	72600 - Biochemistry and Physiology of Photosynthesis (5)	8	6	1.3
				Evolution				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
Benvenisty Nissim	Prof.		Genetics	Human Genetic Disorders	72131 - Genetics Lab - Honor's Program (3.5)	3	1	3
				Regenerative Medicine	72352 - Differentiation Mechanisms and Cancer Transformation (2)	2	3	0.6
				Human Development	72350 - Human Genetics (3)	3	2	1.
				Stem Cells	76880 - Functional Genomics (2)	Short intense course	1	
Brandeis Michael	Assoc. Prof.		Genetics	Live cell imaging	72328 - Guide Project in Biological Research- Honor's Program (5)	Annual project	1	
				Ubiquitin mediated proteolysis	86875 - Selected Topics in Protein Targeting and Cell Cycle (2)	2	2	1
				Cell cycle regulation	72155 - General Genetics A	7	3	2.3

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
					(5.5)			
					72156 - Introduction to Genetics - Honor's Program (3)	3	3	1
					72373 - Introduction to Cell Biology (5)	6	4	1.
Darvasi Ariel	Assoc. Prof.		Genetics	Complex Traits	72301 - Fundamentals of Probability & Statistical Analysis (4)	4	1	4
				Human Genetics	72380 - Introduction to Statistics & Probability- Honor's Program (3)	3	1	3
				Mouse Genetics				
				Statistical Genetics				
Goldberg Michal	Lecturer (Ph.D)		Genetics	Checkpoints	72345 - Topics in Classical and Molecular Genetics (5)	5	2	2.
				DNA damage response	72683 - Molecular Genetics of Eukaryotes (2)	2	1	2
				Cancer	88890 - Graduate Seminar in	2	1	2

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
					Genetics (2)			
Gruenbaum Yosef	Prof.		Genetics	Molecular and genetic analysis of matefin/SUN-1	72156 - Introduction to Genetics - Honor's Program (3)	3	3	1
				Interaction between the nuclear lamina and chromatin	72373 - Introduction to Cell Biology (5)	6	4	1.
				Structure and function of the nuclear lamina	72329 - Guided Project in Biological Research (5)	Annual project	1	
				The lamin, LEM-domain BAF pathway	72155 - General Genetics A (5.5)	7	3	2.3
				The nuclear lamina and aging				
Hirschberg Joseph	Prof.		Genetics	Plant molecular biology	72600 - Biochemistry and Physiology of Photosynthesis (5)	8	6	1.3
				Carotenoid biosynthesis in plants and bacteria	72616 - Introduction to Biotechnology (2)	2	3	0.6
				Photosynthesis	88843 - Molecular Biology of Upper Plants (3)	3	2	1.

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Secretion in Bacteria				
				Plant biotechnology				
Kerem Batsheva	Prof.		Genetics	Human molecular genetics	72521 - Undergraduate Seminar: Genetics (2)	2	1	2
				Nonsense mediated mRNA decay and readthrough thrapy	72350 - Human Genetics (3)	3	2	1.
				Splicing as a modifier of disease severity	88825 - Human Molecular Genetics (3)	3	2	1.
				Chromosomal instability in cancer				
Meshorer Eran	Senior Lecturer (Ph.D)		Genetics	Nuclear architecture				
				Neuronal differentiation				
				Neuronal chromatin				
				Embryonic stem cells				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Chromatin structure and dynamics				
Tzfati Dudy	Senior Lecturer (Ph.D)		Genetics	Telomeres and telomerase	72345 - Topics in Classical and Molecular Genetics (5)	5	2	2.
				Non-coding RNA structure and function	72510 - Recombinant as a Tool in Biology Research (6)	6	4	1.
Hochner Binyamin	Assoc. Prof.		Neurobio-logy	Motor control of the octopus flexible arms - inspiration for robotic	72349 - Lab in Brain & Behavior for Psychobiology Students (3)	Short intense course	4	
				Neurobiology of learning and memory in advanced invertebrates; octopus cuttlefis				
Hochstein Shaul	Prof.		Neurobio-logy	Vision	72526 - Undergraduate Seminar: Brain & Behavior Sciences (2)	2	1	2
				Consciousness	72633 - Topics in Neurobiology (4)	3	2	1.
				Cross-modal Effects				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Computational Neuroscience				
Loewenstein Yonatan	Senior Lecturer (Ph.D)		Neurobio-logy	Neuroeconomics				
				Computational neuroscience				
Mizrahi Adi	Senior Lecturer (Ph.D)		Neurobio-logy	Sensory coding in olfaction and audition	72363 - Introduction to Physiology-Honor's Program (3)	4	2	2
				Epilepsy	72336 - Introduction to Physiology (5)	10	2	5
				Adult neurogenesis	72633 - Topics in Neurobiology (4)	3	2	1.
Nelken Israel	Prof.		Neurobio-logy	Learning and memory at multiple time scales	78891 - Theory and Art of the processing of neural signals (2)	2	1	2
				Auditory system	78844 - Graduate Seminar in Brain Sciences and Behavior (2)	2	1	2
				Structure of natural sounds	72343 - Physiology: Advanced	5	2	2.

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
					Level (5)			
				Analysis of complex sounds				
Segev Idan	Prof.		Neurobio-logy	Experimental and theoretical neurobiology.	72336 - Introduction to Physiology (5)	10	2	5.(
				Computational neuroscience; the neuron as a complicated computing element; individual nerve cells as information processing devices.				
				Time coding by neurons.	72363 - introduction to Physiology-Honor's Program (3)	4	2	2.(
Spira Micha E	Prof.			Cellular and Molecular Neurobiology	72369 - Introduction to Neurobiology (5)	5	2	2.
				Neuroelectronic hybrids	72373 - Introduction to Cell Biology (5)	6	4	1.
				Neuroregeneration				
				Synaptic plasticity				
Yarom Yosef	Prof.		Neurobio-logy	Circadian clock	72349 - Lab in Brain & Behavior for Psychobiology Students (3)	Short intense course	4	
				The cerebellum	72369 - Introduction to Neurobiology (5)	5	2	2.
				Rhythmic activity in the nervous system	76728 - n Vivo Intracellular	Short intense	1	

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
					Recordings (6)	course		
				Neurobiology	78818 - Selected Topics in Cerebellum Research (3)	3	1	3
				Electroreception in sharks				
Zohary Ehud	Assoc. Prof.		Neurobio-logy	Perception and action loops	72349 - Lab in Brain & Behavior for Psychobiology Students (3)	Short intense course	4	
				Functional imaging of the visual system.	72625 - Neural Mechanisms of Animal Behavior (4)	4	2	2
				Coordinate frames in the visual pathways.				
				Plasticity in the human cortex.				
Cohen Yehuda	Assoc. Prof.		Plant & Environmental Sciences		72335 - Introduction to Microbiology (5)	7	5	1.4
					72342 - Microbiology: Advanced Level (5)	5	5	1.(
					72362 - Introduction to Microbiology-Honor's Program (3)	4	5	0.8

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
					72501 - Microbial Ecology (5)	5	2	2.5
Belkin Shimshon	Prof.		Plant & Environmental Sciences	Bacterial stress responses	72616 - Introduction to Biotechnology (2)	2	3	0.6
				Microbial Ecology	76716 - Marine Microbiology (7)	Short intense course	2	
				Water quality				
				Whole cell biosensors				
Green Rachel			Plant & Environmental Sciences	Signal transduction	72346 - Plant Physiology and Biochemistry (5)	8	2	4
				Plants	72653 - An Insight Into Plant Development (2)	2	1	2
				Circadian Rhythms	93817 - Physiology and Molecular Biology of Plants (2)	2	2	1

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Tea
Kaplan Aaron	Prof.		Plant & Environmental Sciences	The CO2 concentrating mechanisms and response to changing atmospheric CO2	72361 - Introduction to Plant Science-Honor's Program (2)	2	2	1
				Interspecies communication of microorganisms within the water body	93831 - Integration of genomes, organelles, biochemical pathways and physiological response (4)	4	3	1.3
				The biological role of cyanobacterial toxins	72334 - Introduction for Plant Science (4)	6	2	3
				Trigerring of cell death by biotic and oxidative stress	72600 - Biochemistry and Physiology of Photosynthesis (5)	8	6	1.3
				Response and acclimation of photosynthetic organisms to environmental stress				
Keren Nir	Senior Lecturer (Ph.D)		Plant & Environmental Sciences	Metal transport in photosynthetic organisms	72334 - Introduction for Plant Science (4)	6	2	3

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
				Response of the photosynthetic apparatus to environmental conditions	93831 - Integration of genomes, organelles, biochemical pathways and physiological response (4)	4	3	1.3
					72600 - Biochemistry and Physiology of Photosynthesis (5)	8	6	1.3
					72361 - Introduction to Plant Science-Honor's Program (2)	2	2	1
Levine Alex	Assoc. Prof.		Plant & Environmental Sciences	Oxidative stress as a major regulator of plant stress signal transduction	72637 - Plant Environment: Physiology and Molecular Biology (2)	2	1	2
				Intracellular vesicle trafficking pathways in plant stress responses	72587 - Plant-Pathogen Relationships (3)	3	1	3
				Symbiotic interactions between Plants and Rhizobacteria				
				Plant responses and adaptation to abiotic stresses				

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hr Teac
Nechushtai Rachel	Prof.	Consultant of an academic Institute, Over 5 hrs up to 10 hrs	Plant & Environmental Sciences	Iron sulfur proteins	72600 - Biochemistry and Physiology of Photosynthesis (5)	8	6	1.3
				Photosynthesis - mainly photosystem I	72524 - Undergraduate Seminar: Plant Sciences (2)	2	1	2
				Biogenesis and assembly of membrane proteins and complexes	72346 - Plant Physiology and Biochemistry (5)	8	2	4
					93852 - Seminar in Plant sciences (2)	2	1	2
Oren Aharon	Prof.	Lecturer in an academic Institute, up to 2 hrs	Plant & Environmental Sciences	The microbiology of the Dead Sea	72335 - Introduction to Microbiology (5)	7	5	1.
				Prokaryote taxonomy and nomenclature	72362 - Introduction to Microbiology-Honor's Program (3)	4	5	0.
				Microbial Ecology	72501 - Microbial Ecology (5)	5	2	2.

	Status	Additional employment outside HUJI	Area of Specialization		Courses Taught by Staff Membe			
			Department	Research Interests	Course Symbol & Name (Course Credits)	Weekly hrs	No. of Teachers	Wee hrs Teac
				Ecology, physiology and taxonomy of halophilic microorganisms	76716 - Marine Microbiology (7)	Short intense course	2	
Post Anton	Prof.		Plant & Environmental Sciences	Diversity and evolution of microbial communities				
				Comparative and environmental genomics of marine cyanobacteria				
				Regulatory networks and environmental stress responses in marine cyanobacteria				
				Molecular ecology of marine phytoplankton				

Table 6.2B
Faculty of Medicine teachers in the LS Program

Family	First	Status	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Altuvia	Shoshana	Associate Professor	72626 - Genetic Engineering of Bacterial and Phages (6.5)	6	2	3
			72707 - Molecular and Cellular Physiology of Microgorganisms (5)	5	5	1
Amster-Choder	Orna	Associate Professor	72707 - Molecular and Cellular Physiology of Microgorganisms (5)	5	5	1
Baniash	Michal	Associate Professor	72342 - Microbiology, Advanced Level (5)	5	5	1
			72665 - Immunology (3)	4	3	1.33
Ben-Neriah	Yinon	Professor	72352 - Differentiation Mechanisms and Cancer Transformation (2)	2	3	0.67
Engelberg-Kulka	Hanna	Professor Emeritus	72664 - Molecular Biology of Bacteria and Bacteriophages (2)	2	1	2
Furman-Schueler	Ora	Senior Lecturer	72677 - Bioinformatics-Computerized Analysis of Biological Seq (3)	3	1	3
Goldberg	Israel	Professor	72707 - Molecular and Cellular Physiology of Microgorganisms (5)	5	5	1
			72679 - Applied Microbiology (2)	5	2	2.5
Golenser	Jacob	Senior Lecturer	72527 - Undergraduate Seminar:Molecular Microbiology (2)	2	3	0.67
Honigman	Alexander	Professor	72745 - Molecular Biology As a basis for Gene Therapy (3)	3	2	1.5
Jaffe	Charles	Professor	72342 - Microbiology, Advanced Level (5)	5	5	1
			72672 - The Biology of the Human Parasites and their Arthropod Vectors (5)	3	2	1.5

Family	First	Status	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Jarrous	Nayef		72527 - Undergraduate Seminar:Molecular Microbiology (2)	2	3	0.67
		Senior Lecturer	72651 - Molecular Biology of Animal Cells (3)	3	2	1.5
Kaempfer	Raymond	Professor	72651 - Molecular Biology of Animal Cells (3)	3	2	1.5
Kanner	Baruch	Professor	72812 - Biochemistry and Physiology of Membrane Proteins (3)	3	4	0.75
Keshet	Eli	Professor	72352 - Differentiation Mechanisms and Cancer Transformation (2)	2	3	0.67
Kotler	Moshe	Professor emeritus	72669 - Molecular Biology of Viruses (2)	4	2	2
Mandelboim	Ofer	Associate Professor	72527 - Undergraduate Seminar:Molecular Microbiology (2)	2	3	0.67
			72665 - Immunology (3)	4	3	1.33
Mitrani	Stella	Professor	72669 - Molecular Biology of Viruses (2)	4	2	2
Naor	David	Professor Emeritus	72665 - Immunology (3)	4	3	1.33
Panet	Amos	Professor Emeritus	72335 - Introduction to Microbiology (5)	7	5	1.4
Pines	Ofri	Associate Professor	72707 - Molecular and Cellular Physiology of Microgorganisms (5)	5	5	1
Polacheck	Itzhak	Professor	72359 - Biology of Fungi (3)	3	1	3
Rokem	Stefan	Senior Lecturer	72679 - Applied Microbiology (2)	5	2	2.5
Rosen	Haim		72342 - Microbiology, Advanced Level (5)	5	5	1
		Professor	72745 - Molecular Biology As a basis for Gene Therapy (3)	3	2	1.5
Rosenshein	Ilan	Professor	72626 - Genetic Engineering of Bacterial and Phages (6.5)	6	2	3

Family	First	Status	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
			72707 - Molecular and Cellular Physiology of Microgorganisms (5)	5	5	1
Rotem	Shlomo	Professor Emeritus	72335 - Introduction to Microbiology (5)	7	5	1.4
			72362 - Introduction to Microbiology (Honor's Program) (3)	4	5	0.8
Stern-Bach	Yael	Associate Professor	72812 - Biochemistry and Physiology of Membrane Proteins (3)	3	4	0.75
Taraboulos	Albert	Associate Professor	72342 - Microbiology, Advanced Level (5)	5	5	1
Warburg	Alon	Associate Professor	72672 - The Biology of the Human Parasites and their Arthropod Vectors (5)	3	2	1.5
Yefe-Nof	Eitan	Professor	72335 - Introduction to Microbiology (5)	7	5	1.4
			72362 - Introduction to Microbiology (Honor's Program) (3)	4	5	0.8

Table 6.2C1
Emeriti Teaching Staff and adjunct/visiting professors

Family	First	Employment Status	Department	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Falck	Raphael	Prof. Emeritus	Genetics	88815 The history of genetic thinking	2	1	2
Ginsburg	Hagai	Prof. Emeritus	Biological Chemistry	72616 - Introduction to Biotechnology (2)	2	3	0.67

Family	First	Employment Status	Department	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Kornberg	Roger	Visiting Prof. (Stanford)	Biological Chemistry	92893 - Chromosome Structure and Regulation of DNA Transcription (2)	Short intensive course	1	
Milner	Yoram	Prof. Emeritus	Biological Chemistry	92812 - Separation Methods in Biochemistry (4)	4	1	4.00
Ohad	Itzhak	Prof. Emeritus	Biological Chemistry	72600 - Biochemistry and Physiology of Photosynthesis (6)	8	6	1.33
Cohen	Dan	Prof. Emeritus	Evolution, Systematics & Ecology	72107 - Introduction to Ecology and Population Biology (5)	5	2	2.50
Lerner	Tzvi	Prof. Emeritus	Plant Sciences	93857 - Topics in Plant Physiology (4)	4	1	4.00
Mayer	Avraham	Prof. Emeritus	Plant Sciences	93831 - Integration of genomes, organelles, biochemical pathways and physiological response (4)	4	3	1.33
Plitman	Uzi	Prof. Emeritus	Plant Sciences	72639 - Plants in the Service of Men (3)	3	1	3.00
Reinhold	Leonora	Prof. Emeritus	Plant Sciences	93817 - Physiology and Molecular Biology of Plants (2)	2	2	1.00
Kiflawi	Moshe	External teacher, PhD		90610 - Scientific Approaches in Ecology (6)	Short intensive course	2	
Levi-Lahad	Efrat	External teacher, PhD		88825 - Human Molecular Genetics (3)	3	2	1.50

Table 6.2C2
Technician status teachers

Family	First	Employment Status	Department	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Doron	Nurit	Research Assoc., PhD	Biological Chemistry	72351 - Workshop in Bioinformatics (4)	3	2	1.50
Reich	Vanda	Research Assoc., PhD	Cell & animal Biology	89714 - Symbiosis (2)	2	1	2
Golani	Dan	Research Assoc., PhD	Evolution, Systematics & Ecology	72646 - Fish Fauna of Israel (4.5)	3	1	3.00
Mann	Varda	Research Assoc., PhD	Genetics	88843 - Molecular Biology of Upper Plants (3)	3	2	1.50
Richler	Carmelit	Research Assoc., PhD	Genetics	72155 - General Genetics A (5.5)	7	3	2.33
Shalev	Deborah	Head of the NMR facility	Wolfson Centre for Applied Structural Biology, HUJI	92619 - A Practical Course for Structural Protein NMR (4)	Short intense course	2	

Table 6.2C3
External Senior Teaching Staff

Family	First	Employment Status	Department	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Fragman-Sapir	Ori	External teacher, PhD		72605 - Vegetatation and Flora of Israel (3)	2	1	2.00
Harman	Oren	External teacher, PhD		87613 - Darwinism (2)	2	1	2.00

Table 6.2C4
Senior Teaching Staff IUI Eilat

Family	First	Employment Status	Department	Course Symbol & Name (Course Credits)	Course Weelky Hours	Number of Teachers	Weekly Hours / Teacher
Baranes	Avi	External teacher, PhD	IUI, Eilat	76719 - Red-Sea Fish-Workshop (4)	Short intense course	1	
Katzir	Gad	External teacher, PhD	IUI, Eilat	76705 - Marine Animal Behavior (6)	Short intense course	2	
Shashar	Nadav	External teacher, PhD	IUI, Eilat	76705 - Marine Animal Behavior (6)	Short intense course	2	

Table 2B
Junior Academic Staff Employed

Name of staff member			Employment	Part of full Time Position In the Institution+		Area of Specialization	Courses taught by the staff member
First	Family	Title	status	Weekly Hours	Per Cent		Name of course
Michal	Avizur	M.Sc	PhD TA	4	40	Biochemistry	Protein Analysis
Ada	Even	M.Sc	PhD TA	4	40	ESE	From cell to organism - lab Ecology of Pollination in Meiron Mtn
Liat	Avrahami	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry of the Cell
Lili	Agranat	M.Sc	MSc TA	3	30	Genetics	General Genetics
Yoav	Adam	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology Introduction to Neurobiology
Ahia	Aurbach	M.Sc	MSc TA	2.5	25	Genetics	General Genetics
Alex	Inberg	M.Sc	PhD TA	4	40	Biochemistry	Bioinformatics workshop
Yael	Albaz	M.Sc	PhD TA	4	40	Biochemistry	Introduction to cell biology Biochemistry & Phsyiol. Of Membrane Proteins
Adi	Aldejam	M.Sc	PhD TA	4	40	Genetics	Topics in Classical and Molecular Genetics
Yifat	Eliezer	M.Sc	PhD TA	4	40	Genetics	General Genetics
Eyal	Elyashiv	B.Sc	MSc TA	2	12.5	ESE	Evolution
Nadav	Askari	M.Sc	PhD TA	3	30	Biochemistry	Separation Methods in Biochemistry
Assaf	Bahat	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry of the Cell - lab Recombinant DNA
Alva	Biran	B.Sc	MSc TA	2	12.5	Plant Sciences	Introduction to Plant Science
Barak	Bloom	M.Sc	PhD TA	4	40	Genetics	General Genetics
Shany	Ben-Arie	M.Sc	PhD TA	4	40	Biochemistry	From Transgene to Protein
Yonatan	Ben-David	B.Sc	MSc TA	2	12.5	ESE	From Cell to organism - lab
Liat	Ben-Moyal	M.Sc	PhD TA	3	30	Biochemistry	Introduction to Molecular Biology From Transgene to Protein
Assaf	Baster	M.Sc	PhD TA	4	40	Genetics	Topics in Classical and Molecular Genetics
Lital	Bar-Ilan	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology
Yonatan	Bar-Yosef	M.Sc	PhD TA	2.5	25	Plant Sciences	Vegetation and Flora of Israel
Tal	Brook	B.Sc	MSc TA	2	12.5	Biochemistry	Introduction to Molecular Biology
Amit	Barzon	M.Sc	PhD TA	4	40	Biochemistry	Introduction to Molecular Biology
Michal	Barzilay-Rokny	M.Sc	PhD TA	4	40	Cell Biology	From Cell to Organism - lab
Yigal	Bornstein	B.Sc	MSc TA	2	12.5	ESE	From Cell to Organism - lab
Yael	Gus	M.Sc	PhD TA	2.5	25	Biochemistry	Biochemistry :Advanced Level

Name of staff member			Employment	Part of full Time Position In the Institution+		Area of Specialization	Courses taught by the staff member
First	Family	Title	status	Weekly Hours	Per Cent		Name of course
Michal	Gilon	M.Sc	PhD TA	4	40	Cell Biology	Processes in Embryonic Development
Chanie	Gal	B.Sc	PhD TA	2	12.5	Biochemistry	Biochemistry of the Cell - lab
Adi	Gilboa-Gefen	M.Sc	MSc TA	2.5	25	Biochemistry	Introduction to Molecular Biology
Noa	Dekel	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology Introduction to Neurobiology
Henya	Dar	M.Sc	PhD TA	3	30	Genetics	Topics in Classical and Molecular Genetics
Dror	Hillman	M.Sc	PhD TA	4	40	Cell Biology	Introduction to Cell Biology
Keren	Haroush	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology
Ron	Weiss	B.Sc	MSc TA	2	12.5	ESE	Ecology of Nature Conservation
Natalie	Weisman	B.Sc	MSc TA	2	12.5	Plant Sciences	Biochemistry of the Cell
Ruth	Chait	B.Sc	MSc TA	2	12.5	ESE	Fish Fauna of Israel
Mor	Hamami	B.Sc	MSc TA	2	12.5	Genetics	Fundamental of Probabilityand Statistics
Anna	Trachtenot	M.Sc	PhD TA	4	40	ESE	Intro. to Ecology & Population Biology
Shahar	Yair	B.Sc	MSc TA	2	12.5	ESE	From Cell to Organism - lab
Michal	Yaakov	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology Physiology: Advanced Level
Esther	Yakir	M.Sc	PhD TA	4	40	Plant Sciences	Plant Sciences: Advanced Level Plants in the Service of Man
Shay	Yerushalmi	M.Sc	PhD TA	4	40	Plant Sciences	Introduction to Plant Science Vegetation and Flora of Israel
Moshe	Cohen-Kotner	B.Sc	MSc TA	2	12.5	Biochemistry	Biochemistry :Advanced Level
Hadas	Leonov	M.Sc	PhD TA	4	40	Biochemistry	Introduction to Molecular Biology
Vered	Levine	M.Sc	PhD TA	2.5	25	Biochemistry	Biochemistry :Advanced Level
Yoav	Livnah	B.Sc	MSc TA	2	12.5	Neurobiology	Topics in Neurobiology
Yael	Litvak	M.Sc	PhD TA	2.5	25	Biochemistry	Biochemistry of the Cell - lab
Noa	Lam	M.Sc	PhD TA	4	40	Genetics	General Genetics
Yaara	Lefler	B.Sc	MSc TA	2	12.5	Biochemistry	Introduction to Physiology
Ari	Meyerson	M.Sc	PhD TA	4	40	Biochemistry	From Transgene to Protein
Omer	Morik	M.Sc	PhD TA	4	40	Plant Sciences	Plant Sciences: Advanced Level
Noa	Morforgo	B.Sc	MSc TA	2	12.5	Biochemistry	Bioinformatics workshop
Dina	Moshitz	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology Physiology: Advanced Level
Meirav	Matto	M.Sc	PhD TA	4	40	Cell Biology	Introduction to Cell Biology
Anna	Matut	M.Sc	PhD TA	3	30	Genetics	General Genetics
Tamar	Makin	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology Introduction to Neurobiology

Name of staff member			Employment	Part of full Time Position In the Institution+		Area of Specialization	Courses taught by the staff member
First	Family	Title	status	Weekly Hours	Per Cent		Name of course
Yoav	Meishar	M.Sc	PhD TA	2.5	25	Genetics	Functional Genomics
Guy	Malkinson	M.Sc	PhD TA	3	30	Neurobiology	Introduction to Neurobiology
Yehoshua	Manor	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry of the Cell
Inbal	Maayan	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry :Advanced Level
Yuval	Nevo	M.Sc	PhD TA	4	40	Genetics	General Genetics
Hadar	Neuman	M.Sc	PhD TA	4	40	Genetics	Topics in Classical and Molecular Genetics
Mor	Nahum	M.Sc	PhD TA	2.5	25	Neurobiology	Physiology :Advanced Level
Nir	Nesher	M.Sc	PhD TA	4	40	Cell Biology	From Cell to Organism - lab
Carmit	Natan	B.Sc	MSc TA	2	12.5	Cell Biology	Introduction to Cell Biology
Tal	Solomon	B.Sc	MSc TA	2	12.5	Biochemistry	Biochemistry of the Cell
Julia	Sejman	M.Sc	PhD TA	4	40	Genetics	General Genetics
Naomi	Stanley	M.Sc	PhD TA	3	30	Genetics	Topics in Classical and Molecular Genetics
Eitan	Solomon	B.Sc	MSc TA	2	12.5	Plant Sciences	Introduction to Plant Sciences
Nir	Sapir	M.Sc	PhD TA	4	40	ESE	Evolution and Ecology of Birds
Lior	Sri	B.Sc	MSc TA	2	12.5	Plant Sciences	Plant Sciences: Advanced Level
Efrat	Ozri	M.Sc	PhD TA	4	40	Genetics	General Genetics
Erez	Podoli	M.Sc	PhD TA	3	30	Biochemistry	From Transgene to Protein
Oren	Fine	M.Sc	PhD TA	4	40	Genetics	General Genetics
Omri	Finkel	B.Sc	MSc TA	2	12.5	Plant Sciences	Introduction to Plant Sciences
Dafna	Peleg-Feldman	B.Sc	PhD TA	4	40	Cell Biology	Recombinant DNA
Natalie	Friedman	M.Sc	PhD TA	4	40	Cell Biology	From Cell to Organism - lab
Alexandra	Fridkin	M.Sc	PhD TA	2.5	25	Genetics	Human Genetics
Netanel	Zarum	B.Sc	MSc TA	2	12.5	Biochemistry	Biochemistry of the Cell
Assaf	Tzoar	M.Sc	PhD TA	4	40	ESE	Ecology: Advanced Level Scientific Approaches in Ecology
Daniel	Tzoren	B.Sc	MSc TA	2	12.5	ESE	Evolution
Gidon	Coster	M.Sc	PhD TA	4	40	Genetics	Fundamental of Probabilityand Statistics
Hagit	Koppel	M.Sc	PhD TA	4	40	Neurobiology	Introduction to Physiology
Oded	Cooper	M.Sc	PhD TA	4	40	Genetics	General Genetics
Michael	Klotstein	M.Sc	PhD TA	4	40	Genetics	Topics in Classical and Molecular Genetics
Nina	Kamaniya	M.Sc	PhD TA	4	40	Plant Sciences	Plant Sciences: Advanced Level
Natalie	Carbachenko	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry :Advanced Level
Ido	Karon	M.Sc	PhD TA	4	40	Plant Sciences	Plant Sciences: Advanced Level
Eliyahu	Raveh	M.Sc	PhD TA	4	40	Cell Biology	Processes in Embryonic Development
Ronen	Ron	B.Sc	MSc TA	2	12.5	ESE	Intro. to Ecology & Population Biology

Name of staff member			Employment	Part of full Time Position In the Institution+		Area of Specialization	Courses taught by the staff member
First	Family	Title	status	Weekly Hours	Per Cent		Name of course
Shulamit	Ron	M.Sc	PhD TA	4	40	Cell Biology	Processes in Embryonic Development
Michal	Schwartz	M.Sc	PhD TA	2.5	25	Genetics	Topics in Classical and Molecular Genetics
Sarit	Schwartz	M.Sc	PhD TA	2.5	25	Biochemistry	Biochemistry of the Cell (chem. Students(
Maya	Schwartzman	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry of the Cell (chem. Students(
Or	Shahar	M.Sc	PhD TA	4	40	Genetics	Fundamental of Probabilityand Statistics
Ofer	Steinitz	M.Sc	PhD TA	4	40	ESE	Ecology of Nature Conservation Ecology: Advanced Level
Carmit	Strauss	B.Sc	MSc TA	2	12.5	Genetics	General Genetics
Alit	Starke	M.Sc	PhD TA	2.5	25	Neurobiology	Neurobiology Lab for Psychobiology studen
Lilach	Shmuel	M.Sc	PhD TA	4	40	Biochemistry	Biochemistry of the Cell
Lior	Shmuelof	M.Sc	PhD TA	3	30	Neurobiology	Introduction to Physiology Neurobiology Lab for Psychobiology studen
Or	Shemesh	M.Sc	PhD TA	2.5	25	Neurobiology	Introduction to Physiology
Yair	Shemesh	M.Sc	PhD TA	3	30	ESE	Intro. To Ecology & Population Biology Ecology of Pollination in Meiron Mtn
Hagai	Shpigler	M.Sc	PhD TA	4	40	ESE	Intro. To Ecology & Population Biology From Cell to Organism - Lab
Omri	Shatz	M.Sc	PhD TA	4	40	Cell Biology	Processes in Embryonic Development
Sigal	Skolnik	M.Sc	PhD TA	4	40	Plant Sciences	Introduction to Plant Sciences
Nadav	Sharon	B.Sc	MSc TA	2	12.5	Genetics	General Genetics Lab for Etgar
Oz	Sharaby	M.Sc	PhD TA	2	12.5	Biochemistry	Biochemistry :Advanced Level
Kefir	Sharaby	M.Sc	PhD TA	4	40	Genetics	General Genetics