The Hebrew University of Jerusalem

The Rachel and Selim Benin School of Computer Science and Engineering

Self-Evaluation Report for the year 2012

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Executive Summary[1]

- **A short summary of the main strengths and weaknesses that were pointed out in the self-evaluation process.**
- **A short description of the actions the Institution, the Parent Unit and the Department are going to take in order to improve the weak points that were found.**
- **A brief statement as to the extent which the Study Program has achieved its mission, goals and learning outcomes, and whether the outcomes comply with its mission statement. Are the Institution, Parent Unit and Department satisfied with the outcomes of the Study Program?**
- **If the study program has previously gone through the CHE quality assessment process – please briefly describe the main changes that have been made in the program since the last evaluation.**

Study program: Our program currently offers a variety of tracks which is appropriate for top-notch computer science education. The program is highly competitive, very demanding and provides high level of theoretical education and practical skills. Its excellent reputation allows it to attract outstanding students. Our graduates are able to quickly find work and contribute to Israel's Hi-tech industry, or continue their studies at the best research institutes worldwide. The program's main weakness is our inability to cover all areas of computer science, including some important areas such as programming languages and compilers. We also face difficulties in attracting students to Jerusalem.

Staff and research: The group of faculty members of the school is composed of highly skilled and committed individuals, with worldwide reputation in their respective research areas. This is the main factor contributing to the high ranking of the school - it is ranked the 27th top CS Department worldwide according to the Shanghai academic ranking. It also allows the department to attract excellent faculty candidates. The supportive administration staff is a group of dedicated and skilled individuals, who is responsible for the smooth management of the school. The main weakness is the emerging difficulty in the last couple of years to attract new faculty members who will settle in Jerusalem.

Infrastructure: The new building will support all the needs of the school, from teaching to research, for many years to come. The library is still lacking space.

We are constantly evaluating and improving our study program, as part of a continuous process. In the next academic year we will introduce small modifications to the list of obligatory and elective courses, as listed below. We will also change the format of the M.Sc. exam, since students found the previous format stressful and time consuming. Most importantly, to address the problem raised by the continuous increase in the number of students and the opening of the engineering program, we will start a process by which we offer some of the first and second year mandatory courses in both the first and the second semesters. This will allow students more flexibility, and lower the burden in the first year. We will continue the process of offering more tutoring groups to decrease the number of students in each group. As part of the faculty of natural sciences, we will tighten the schedule of exams and provide faster response time, in order to reach a state where all grades are known and final before the next academic year starts.

We see our mission as providing our students with excellent understanding of fundamental scientific principles in computer science, as well as the basic technical skills which will allow them to enter and influence the Israeli Hi-tech job market. Generally speaking we are satisfied with our study program and believe that it accomplishes this mission; we do not plan any fundamental changes to the program.

The program has gone through a CHE quality assessment process before. We have implemented many changes to address the comments and recommendations obtained in this earlier process: (i) The current report was prepared in a different process, involving almost all faculty members. (ii) We invested a lot of thinking and effort in the development plans of the school of engineering in recent years. (iii) We work on constantly lowering the grades in our various courses; as of next year, it will be required that all obligatory and elective courses achieve an average grade of roughly 85. (iv) As funding to the department increases, we constantly increase the number of TA's assigned to each obligatory course, in order to decrease the size of the tutoring groups. (v) Grading time of exams has been reduced to 2 weeks in this year, and will be further reduced to 10 days in the next year. (vi) An alternative infinitesimal math course has been developed a few years ago, and it is offered to the engineering students and those who major in two subjects, in order to decrease the load on these students. (vii) We are offering fellowships to excellent M.Sc. students, in order to encourage the best undergraduates to come to HUJI for their graduate studies.

[1] The length of the Executive Summary should be about one page.

Chapter 1

The Hebrew University of Jerusalem

1.1 A brief summary 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), names of the faculties /schools/departments in the institution, the overall number of students studying towards academic degrees in the institution according to faculty and 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 first 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 University has since continued to grow, with the addition of new buildings, the establishment of new programs, and the recruitment of outstanding scholars, researchers and students, fulfilling its commitment to excellence.

The Hebrew University in Jerusalem was accredited as an institution of higher education by the President of Israel, Mr. Itzhak 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 Paul Baerwald School of Social Work and Social Welfare, 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.
- Edmond J. Safra campus in Givat Ram, site of the Faculty of Mathematics and Natural Sciences, The Rachel and Selim Benin School of Engineering and Computer Sciences, The Center for the Study of Rationality, The Institute for Advanced Studies, and the Edmond and Lily Safra Center for Brain Sciences.
- Ein Kerem campus, site of the Faculty of Medicine (The Hebrew University–Hadassah Medical School, Braun 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 Robert H. Smith Faculty of Agriculture, Food and Environment (The School of Nutritional Sciences and The Koret School of Veterinary Medicine).
- An additional site is the Interuniversity Institute for Marine Science in Eilat, operated by the Hebrew University for the benefit of all institutions of higher learning in Israel.

Below is the overall number of students studying towards academic degrees in the institution by degree:

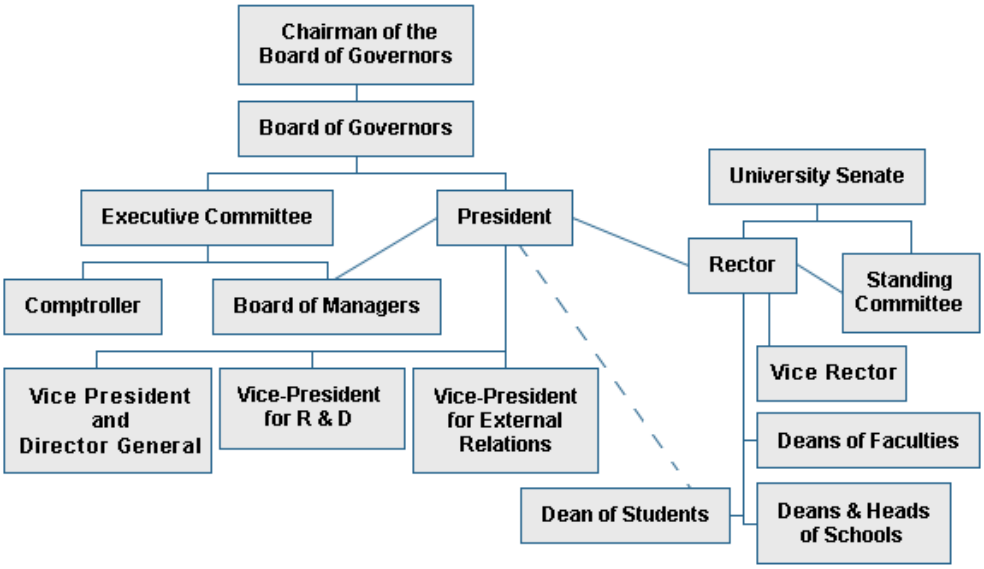
Students of the Hebrew University (2011)			
1st degree	2nd degree	Ph.D	Total
11258	6742	2573	20573

1.2 Mission statement of the institution, its aims and goals.

As the first research university in Israel, The Hebrew University's mission is to develop cutting edge research, and to educate the future generations of leading scientists and scholars in all fields of learning. The Hebrew University is part of the international scientific and scholarly network: we measure ourselves by international standards and we strive to be counted among the best research universities worldwide.

The Hebrew University is a pluralistic institution, where science and knowledge are developed for the benefit of humankind. At the same time, the study of Jewish culture and heritage are a foremost legacy of the Hebrew University, as indicated by both its history and its name. The goal of the Hebrew University is to be a vibrant academic community, committed to rigorous scientific approach and characterized by its intellectual effervescence. These will both radiate and enlighten the University's surrounding society.

1.3 A description and chart of the institution's organizational structure, and the names of holders of senior academic and administrative positions.



Chairman of the Board of Governors:	Michael Federmann
President:	Prof. Menahem Ben Sasson
Rector:	Prof. Sarah Stroumsa
Vice-President and Director-General:	Billy Shapira
Vice-President for Research and Development:	Prof. Shai Arkin
Vice-President for External Relations:	Carmi Gillon
Vice-Rector:	Prof. Yaacov Schul
Vice-Rector	Prof. Oded Navon
Comptroller:	Yair Hurwitz

Deans:	
Faculty of Humanities:	Prof. Reuven Amitai
Faculty of Social Sciences:	Prof. Avner de Shalit
Faculty of Law:	Prof. Barak Medina
Faculty of Mathematics & Natural Science:	Prof. Gad Marom
Faculty of Agriculture, Food & Environment:	Prof. Aharon Friedman
Faculty of Medicine:	Prof. Eran Leitersdorf
Faculty of Dental Medicine:	Prof. Adam Stabholtz
School of Business Administration:	Prof. Dan Galai
School of Social Work:	Prof. John Gal
Dean of Students:	Prof. Nurit Yirmiya

Chapter 2

The Faculty of Science[2]

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 Mathematics and Sciences was founded initially as the Faculty of Mathematics. Its first Dean, 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 were later joined together to form the Faculty of Science. The War of Independence in 1948 left the University's campus cut off from Israeli west Jerusalem, and alternative facilities were located throughout the city. In 1953, construction began on a new main campus on Givat Ram in the heart of Jerusalem (currently the Edmond J. Safra Campus). During the Sixties and Seventies the research and teaching activities were all transferred to this campus.

2.2 Mission Statement of the Institute, its Aims and Goals

The two major missions of the Faculty of Science and Mathematics are 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- 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.

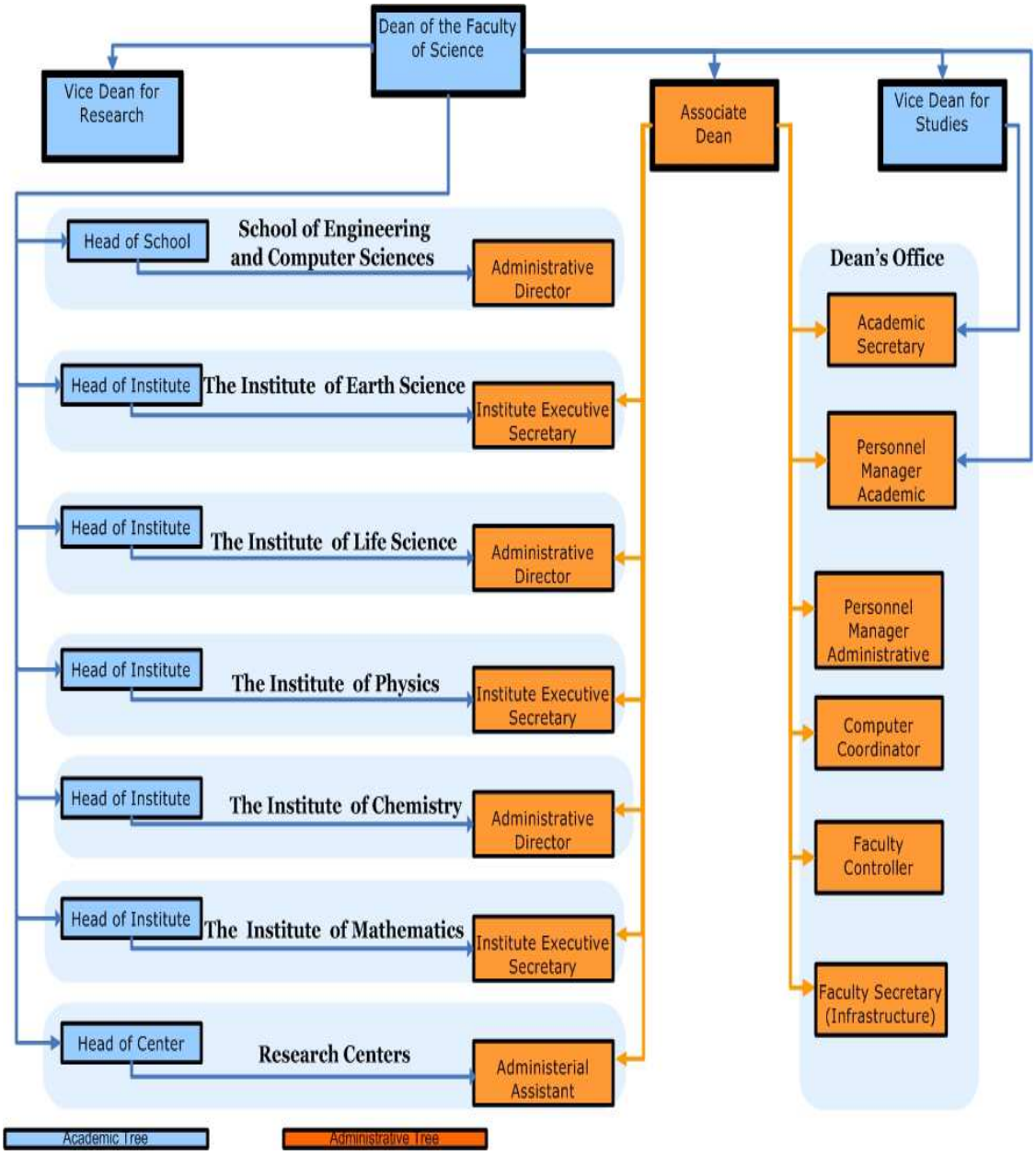
Research – The level of research carried out in the Faculty of Science is one of the highest in the world. The average ranking for 2011 of this Faculty by the Shanghai Academic Ranking of World Universities is 36. In their work, spanning many varied disciplines, our scientists and research students contribute 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), names of holders of senior academic and administrative positions and list of departments/study programs operating in its framework.

The Faculty of Science consists of five research institutes: *Mathematics, Physics, Life Sciences, Chemistry* and *Earth Sciences*, as well as of *the School of Engineering and Computer Science.* They are all located on the Edmond J. Safra Campus in close proximity to one another, which enables bridging various scientific and technological fields and creating new versatile research directions. In that regard, the presence on the same campus of additional institutes is also extremely beneficial. Various combinations of such different basic fields are 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 comprises some 220 faculty members, around 2,000 undergraduates and some 1,500 MSc and PhD research students.

[2] 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.

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 Fields Medal in Mathematics** (Prof. E. Lindenstrauss, 2010); **The Israel Prize** (Prof. Y. Bekenstein, Physics, 2005; Prof. Z. Rapaport, Chemistry, 2006; Prof. Z. Selinger [ז"ל], Biology, 2007; Prof. D. Kazhdan, Mathematics, 2012); **The Wolf Prize** (Prof. A. Levitzki, Life Sciences, 2005; Prof. H. Furstenberg, Mathematics, 2007; Prof. Y. Bekenstein, Physics, 2012); **The EMET Prize** (Prof. H. Furstenberg, Mathematics, 2004; Prof. M.O. Rabin, Computer Science, 2004; Prof. Z. Selinger [ז"ל] , Biological Chemistry, 2005; Prof. Z. Garfunkel, Geology, 2006; Prof. B. Kerem, Life Sciences, 2008; Prof. I. Willner, Chemistry, 2008; Prof. S. Shelah, Mathematics, 2011; Prof. M. Devor, Life Sciences, 2012); **The Fermat Prize** for Mathematical Research (Prof. E. Lindenstrauss, 2009); **The Rothschild Prize** (Prof. D. Kazhdan, 2010; Prof. G. Kalai, Mathematics, 2012); **The Weizmann Prize** (Prof. J. Bekenstein, Physics, 2011); **The Dan David Prize** (Prof. M.O. Rabin, Computer Science, 2010).



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 institutes 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's Teaching Committee under the Vice Dean for Teaching.

*Names of holders of senior positions at the Faculty of Science (*at the time the report was written):

Dean of Faculty: Prof. Gad Marom

Associate Dean: Dr. Jacob Nissenbaum

Vice-Dean for Studies: Prof. Nathan Paldor

Vice-Dean for Research: Prof. Yosef Yarom

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

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 below:

- **Bachelor of Science**
  Upon successful completion of the required course of studies in the Department(s) of …

- **Bachelor of Science**
  Upon successful completion of the required course of studies in the Department(s) of … with Specialization in ...

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

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

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

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

List of Departments and Programs of Study

Science Instruction	הוראת המדעים		MSc	Ph D
Applied Physics	פיסיקה יישומית		MSc	Ph D
Talpiot Program	תכנית תלפיות	BSc		
Computer Sciences	מדעי המחשב	BSc	MSc	Ph D
Mathematics	מתמטיקה	BSc	MSc	Ph D
Math. & Math. Teaching	מתמטיקה במסלול הוראה	BSc		
Computer Science & Computational Biology	מדעי המחשב וביולוגיה חישובית	BSc	MSc	Ph D
Physics	פיסיקה	BSc	MSc	Ph D
Atmospheric Sciences	מדעי האטמוספירה		MSc	Ph D
Special Honors Program	אמירים - תכנית מצטיינים - מדעי הטבע	BSc		
Chemistry	כימיה	BSc	MSc	Ph D
Chemistry & Life Sciences	מדעי הכימיה והביולוגיה - *תכנית משולבת*	BSc		
Physics & Chemistry	פיסיקה כימיה- *תכנית משולבת*	BSc		
Life Sciences	מדעי החיים - (ביולוגיה)	BSc		
Life Sciences - "Etgar" Program	מדעי החיים-(ביולוגיה)--בתכנית "אתגר"		MSc	Ph D
Plant Science	מדעי הצמח-בוטניקה		MSc	Ph D
Cellular & Developmental Biology	ביולוגיה תאית והתפתחותית		MSc	PhD
Genetics	גנטיקה		MSc	Ph D
Brain & Behavioral Sciences	מדעי המח וההתנהגות		MSc	Ph D
Structural & Molecular Biochemistry	ביוכימיה מבנית ומולקולרית		MSc	PhD
Ecology, Evolution & Behavior	אקולוגיה, אבולוציה והתנהגות		MSc	Ph D
Bio-Engineering	ביו- הנדסה *מסלול ישיר לדוקטורט*			Ph D
Computer Engineering	הנדסת מחשבים	BSc		
Computer Engineering-Specializ. In Applied Physics	הנדסת מחשבים בהתמחות מיקרו/אופטואלקטרוניקה	BSc		
Genomics And Bioinformatics	התמחות בגנומיקה וביואינפורמטיקה		MSc	Ph D
Hydrology And Water Resources	הידרולוגיה ומשאבי מים *תכנית על פקולטאית*		MSc	
Geology	גיאולוגיה		MSc	Ph D
Environmental Studies	תכנית ללימודי הסביבה	BSc	MSc	Ph D
Oceanography	אוקיאנוגרפיה		MSc	Ph D
Earth Sciences	מדעי כדור הארץ במגמת גאולוגיה או במגמת אקלים אטמוספירה ואוקיאנוגרפיה	BSc		
Management Of Technology	ניהול טכנולוגיה		MSc	
Biotechnology	ביוטכנולוגיה *חוג*		MSc	

	על פקולטאי			
Practice Study Of Rationality	התמחות בחקר הרציונאליות *מסלול ישיר לדוקטורט*			Ph D
Specialization In Nano Science And Nano Technology	התמחות בננו מדע וננו טכנולוגיה אפשרות התמחות בחוגים: פיסיקה/כימיה/פיסיקה יישומית		MSc	

2.4 Please provide in the format of a table, the number of students in each one of the Unit's departments who are studying and have studied in the unit in each of the last five years according the level of degree (first, second with thesis, without thesis, doctoral).

Number of students in the Faculty of Science

Academic Year	BSc*	MSc with thesis	MSc without thesis	PhD
2006-07	2217	638	75	663
2007-08	2262	651	75	677
2008-09	2299	643	75	626
2009-10	2250	619	84	605
2010-11	1945	636	66	617
2011-12	1946	600	41	604

*The actual numbers can be around 15% lower accounting for BSc students who are enrolled in joint study programs

2.5 Please provide in the format of a table, the number of students who have graduated from the unit in each of the last five years according the level of degree (first degree, second degree with thesis, without thesis, doctoral degree).

Number of graduates of the Faculty of Science

Graduation Year	BSc	MSc with thesis	MSc without thesis	MSc in direct studies to PhD	PhD
2007	480	144	10	22	68
2008	476	154	17	26	89
2009	505	129	23	16	78
2010	542	175	19	17	92
2011	513	167	36	19	105
2012	480	154	24	17	98

2.6 Who decides (internal/external bodies) on the rationale, mission and goals of the parent unit and of the study programs? What were the considerations behind these decisions and are they periodically re-examined and, if deemed necessary, changed? What were the changes made (if any)? How are the mission, goals and changes brought to the attention of the teaching staff, the students and the institution's authorities?

The body that is academically responsible for the teaching programs is the Faculty's Teaching Committee. It is headed by the Vice Dean for Teaching and it comprises the heads of all the Faculty's teaching programs (including the Head of the Biotechnology Graduate Program) and students' representatives (the Dean is an *ex-officio* member). The main responsibilities of the Faculty's Teaching Committee are to propose, discuss, approve and monitor all the Faculty's teaching programs including interfaculty as well as interuniversity programs. Depending on the issue at hand, new programs are submitted for ratification by the University's Standing Committee and – if required – by the Council for Higher Education. Changes in teaching programs, goals and missions are delegated to the Faculty and students, via the corresponding members of the Faculty's Teaching Committee.

2.7 What is the Parent Unit's perception of the evaluated Study Program/Department within its greater framework? Is the Study Program represented in the Parent Unit's decision-making bodies?

The School of Engineering and Computer Science is supervised academically by the faculty of science reviewed above. The school itself was founded with the Computer Science Department as its core unit, and Computer Science continues to occupy a central position within the larger School of Engineering. This centrality is reflected in the large percentage of students within the School that are majoring in Computer Science, as well as the large percentage of existing and new CS faculty members within the overall School. Even as the School of Engineering hires new faculty members in related engineering fields (e.g., information and signal processing, applied physics), and expands its studies in computer engineering and photoelectronics/optoelectronics, it values the Computer Science department as a strategic asset of great importance: it provides the School with an established core of internationally recognized, world-class research, as well as an intensive, rigorous, and highly-esteemed study program training the majority of its students. Expansion of the School of Engineering is done in a way that leverages the existing strengths of its CS component. Because of the central place that Computer Science occupies in the overall School, the latter's decision-making bodies have ample CS representation; for example, the School's hiring process involves discussions of all faculty members followed by discussions in the va'adat sinun screening committee (both with significant CS representation), and all chairmen of the School have been professors of Computer Science.

Chapter 3

The Evaluated Study Program - School of Computer Science

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.

3.1. The Goals and Structure of the Study Program

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

The Department of Computer Science is a part of the School of Computer Science and Engineering, which is one of the academic units of the Faculty of Mathematics and Science. Its history is rooted in the world-renowned Institute of Mathematics, where research on theoretical aspects of computer science had started in the late 1950s. Three graduate students, Haim Gaifman, Micha Perles and Eli Shamir, were research assistants of Professor Yehoshua Bar-Hillel from the Philosophy Department, who had an ONR (Office of Naval Research) grant on formal languages. In 1961, Bar-Hillel, Perles and Shamir published the pumping lemma for regular languages.

In 1958, Michael Rabin joined the Institute of Mathematics (earlier, he had received an M.Sc. from The Hebrew University in 1953 and a Ph.D. from Princeton University in 1956). In 1959, he published with Dana Scott the seminal paper on finite automata, for which they were awarded the Turing Award in 1976. In 1960, Rabin showed (in a Hebrew-University Technical Report) that there is a hierarchy of recursive sets based on the inherent difficulty of their decision procedures . This work is the origin of what is now known as computational complexity theory. Later on he extended finite automata to infinite trees, a result with profound implications to program verification. Later he innovated randomized algorithms, now a central topic in computer science. In 58-59 Rabin conducted at HU the first ever seminar in Israel on automata and formal languages; amongst the students: Gaifman, Perles and Shamir.

In the early 1960s, Eli Shamir had quite a few results in the area of formal languages, but Michael Rabin advised him to do his Ph.D. in mathematics, because that type of results was not adequately appreciated by mathematicians. So, Shamir's dissertation was on differential equations. He had received his Ph.D. in 1963, and returned to The Hebrew University in 1966 as a faculty member of the Institute of Mathematics.

In 1969, the Institute of Mathematics established a graduate program in computer science. About a decade later, after long debates in the Institute of Mathematics, the graduate program was extended to a full-fledged department of computer science, including an undergraduate curriculum. There were many skeptics, among the members of the Institute of Mathematics, who were worried about the lack of an established curriculum for computer science, the severe shortage of suitable candidates for academic positions, and the uncertainty whether students would want to study this nascent discipline. However, Rabin and Shamir persevered in their effort to convince their fellow mathematicians. In 1980, the new department formally received academic accreditation from the Council of Higher Education. By 1982, it comprised eleven faculty members, including Rabin and Shamir who had joint appointments in Mathematics and Computer Science.

The Department of Computer Science was responsible for its own curriculum and for screening candidates for faculty positions. However, academically and administratively, it operated under the auspices of the Institute of Mathematics. In 1992, it gained complete independence with the inauguration of the Institute of Computer Science.

The original core of faculty members has been steadily expanding at an average rate of about one new faculty position per year, reaching 25 members by 1998. The number of students has also been

steadily growing, especially in the past twenty years, to accommodate the many new immigrant students, and in response to the great demand of Israeli industry for professionals with computer science education.

The Institute's strong international reputation is evident in many ways. Research conducted in the school is published in the most prestigious journals and conferences. The department wins many competitive research grants, both in Israel and abroad. Numerous internationally famed investigators, as well as many brilliant postdoctoral fellows, come here for short visits and for extended stays. Many research projects are carried out in collaboration with scientists from many other countries. Finally, two members of the faculty won the most prestigious prizes in Computer Science (the Turing Award) and Theoretical Computer Science (the Nevanlinna Prize), and many more have won other highly prestigious awards.

In its early days, the research core of the school focused on the more theoretical aspects of computer science. As the number of faculty members grew, a more balanced blend has been achieved. Today, software, theory, and applications are represented in both teaching and research. This maturation and expansion has allowed the development of close ties with industry.

The main research areas in the computer science branch of the school are currently: design, analysis and complexity of algorithms; parallel computer architecture and operating systems; reliable distributed systems; intelligent robotic sensing: computer vision, speech analysis, signal analysis, pattern recognition and robotics; computer-aided surgery and medical image processing; computer-aided design; data base design; artificial intelligence, neural networks and learning; computer networking and computer communication; cryptography and computer security; internet and e-systems; quantum communication and computation; and biological systems – computational biology.

Growing needs of the economy in Israel, and a view towards the future, have necessitated developing new directions. In October 1999, The School of Computer Science and Engineering was founded, with its first unit being the prestigious Institute of Computer Science. New programs were established in software and computer engineering.

In 2003, the Department of Applied Physics of the Herrmann Graduate School of Applied Science joined the School of Computer Science and Engineering. This was followed by launching a new program in Computer Engineering with specialization in optoelectronics and microelectronics. The well-established program of M.Sc. in applied physics also continues under the wings of the School of Engineering.

In October 2005, the School of Computer Science and Engineering began a new interdisciplinary program in Biomedical Engineering. It was recognized that the outstanding quality of the faculty of the Hebrew University of Jerusalem in virtually every biomedical-engineering-related field, from mathematics to physics and chemistry, computer science to molecular biology, nanotechnology to robotics to imaging, could be combined to produce at HUJI a leading program in the rising area of biomedical engineering. As a first step towards accomplishing this goal, we began hiring outstanding faculty in the field, and the “Center for Biomedical Engineering in the service of Humanity and Society” has been established, and represents the large-scale goals of the program. A graduate program in biomedical engineering has begun and students are already enrolled in the program. The main research areas in biomedical engineering in the school include: medical imaging, robotics, bioelectronics, tissue engineering, micro and nano biotechnology, medical devices, and biological energy research.

The School of Computer Science and Engineering, excluding Applied Physics, currently has 36 faculty members and 7 emeriti professors. Applied Physics has 9 faculty members and 2 emeriti professors. The expected growth, in the near future, is to 50 faculty members. The School as a whole is focused on maintaining and developing its world-renowned excellence in research in a very wide range of areas. In tandem, our goal is to educate an elite crop of motivated and independent researchers that would lead the future's high-tech industries.

3.1.2. Mission statement of the department / study programs, its aims and goals. What is the Strategic Plan of the department and its study programs? Please attach the Strategic Plan.

Computer Science is the modern language of Science as computation lies at the heart of understanding all physical and biological systems, and computer science tools are geared to explain all complex system interaction. Our goals are to sharpen those tools, study their capabilities and fundamental limitations, and apply this knowledge, with an eye on long-term global-impact, as widely as possible.

In the early days, our department had a highly theoretical flavor. But over the years, more practical and applied directions have been pursued. This is reflected in both the research areas of the department and the courses it offers. Our approach is comprehensive, namely, we emphasize broad education in computer science, but not at the expense of depth. We believe that students should learn principles, both theoretical and practical, and not merely practice techniques. The goal of the school is to nourish and train graduates in computer science, enriching them with profound practical and theoretical background, thereby preparing them for leading roles in the hi-tech industry and the internet environment, and enabling them to conduct world-class research. Algorithms and computer science play a central role in the development of computerized systems. In depth study of computer science foundations, multidisciplinary education and the global view that these graduates acquire, will prepare them for dealing with future challenges both in technology and research.

Our undergraduate academic goal is to provide students with analytical thinking tools, knowledge and understanding of the workings of computers and their use, as well as practical experience in designing and building software systems. The purpose of our graduate studies is to provide general knowledge and deep understanding of focused directions chosen by the student, which will lead to excellence in research. We aim to set international standards in different academic fields, and establish internationally known leading research groups. Our curriculum is challenging and is tailored for the best, most talented students, who will eventually be leaders of innovation, in both academia and industry.

Our strategic plan is not just to hire the best researchers for academic positions, but also to constantly expand the spectrum of research areas as well as introduce, at an early stage, new courses in emerging fields. We were, for example, among the first in Israel and in the world to develop research and teaching in learning theory, computational biology, internet technologies and electronic commerce.

We already have a successful, high quality graduate program. Part of our strategic plan is to increase the enrolment in this program and, in particular, to draw more graduate students that are not our former undergraduates. This will not just enhance and expand our research effort, but is also likely to improve the quality of our undergraduate education, because there will be a larger pool from which to select the best teaching assistants. We are also contemplating an international graduate program that will be taught in English.

To broaden the education of our students, we support double-major programs, including the traditional Computer Science and Mathematics and Computer Science and Physics. Over the years, we have developed several novel combinations, including Computational Biology, a four-year program for a B.Sc. in Computer Science and MBA, a triple-field program in Computer Science, Statistics and Economics, and a program in Computer Science and Cognitive Science. At the graduate level, there is an interdisciplinary center for brain science, in which some of our students and faculty participate. We view interdisciplinary programs, at both the undergraduate and graduate levels, as one of our main these programs attract the best students that we have. We intend to continue the effort of developing new interdisciplinary programs and improving the existing ones.

In addition, we plan to strengthen our ties with industry in order to better prepare our students for jobs in the hi-tech industry, and to facilitate technology transfer from our research work to practical applications and products.

3.1.3. Description and chart of the academic and administrative organizational structure of the departments and its study program/s (including relevant committees and names of senior administration).

The school's organizational structure is based on academic leadership, committees in various fields and three central administrative offices. The administrative operational concept of the school is adapted to the requirements of our students and faculty; the school's organizational structure fits nicely in the overall structure of the university at all levels. A parallel structure can be observed in principle to the broad general structure of the university and the Faculty of Mathematics and Science.

School leadership

The school leadership includes the head of school and program heads. The head of school is responsible for the management of the academic program and establishing policy in various administrative matters; he represents the school before the Dean of the Faculty of Science, the university administration and foreign officials; he appoints position holders within the school; and more. Program heads are responsible for the operation and development of the teaching programs. The school has four teaching programs, and each program head is in charge of one. The school's administrative staff aids the academic leadership in performing all the duties necessary to run the school in accordance with the established policy. The school's academic leadership conducts periodically discussions on various subjects such as the teaching curriculum. Decisions of the school leadership are brought to the attention of the school faculty, where important decisions are brought to a vote by the entire academic community.

Committees

The school has 6 main committees, whose role is to assist the ongoing management of the school. They constitute an important part of the daily management of the school. They are installed in accordance with proper administrative procedures of the university. Below is a list of the committees and their main responsibility domains.

a) Curriculum Committee of the School: the head of this committee is the program head of the Computer Science program. Other members include academic consultants for the various years and all school programs. The committee meets several times during the year to discuss changes in the curriculum, the structure and content of mandatory courses, and proposals for new courses.

b) Promotion committee, which manages the following areas:
   - New candidates in the academic track for lecturer and higher ranks.
   - Teachers in the rank of lecturer and above at the end of their first appointment.
   - Promotion of teachers at the rank of lecturer and above at the end of their trial period, with or without tenure, and for granting tenure.
   - Extension of the appointment at the rank of lecturer and above after first appointment.

c) Infrastructure Committee, which manages the following areas:
   - Represent the school before the university infrastructure and equipment committee.
   - Set a policy and priorities for the purchase of departmental equipment.
   - Assist new faculty with initial funding for equipment purchase.
   - Reach decisions and approve new equipment purchase.
   - Supervise the academic activities of the school's system group.

d) Library Committee, which manages the following areas:
   - Represent the school before the Director of the authority of library management.
   - Set a policy for the purchase of books and periodicals.
   - Decide the distribution of the library budget.
   - Collect statistical measures for the use of magazines and books.
   - Decide on the cancelation or purchase of periodicals.

e) The Building Committee, which manages the following areas:
   - Set policy and make decisions regarding areas of teaching and research activities.
   - Approve construction work and school structure adjustments.

- Collect statistics for the use of school areas.
- Represent the school in issues concerning construction.

f) Awards Committee: determine and rank candidates for competitive grants, scholarships and awards to students in different degrees, according to the criteria defined

The SYSTEM group

The school's system group is responsible for the ongoing maintenance, development and improvement of computation and communication networks comprising the school's infrastructure. This includes maintenance of the central computers room, computer farms, and computers in research laboratories and other teaching labs.

School Administration, composed of four main offices:

a) School Secretariat: This office is responsible for the management and proper functioning of the entire school system. It represents the school in administrative matters before internal and external bodies. In addition, it manages requests by faculty members, the promotion committee and ongoing assistance to the head of school.

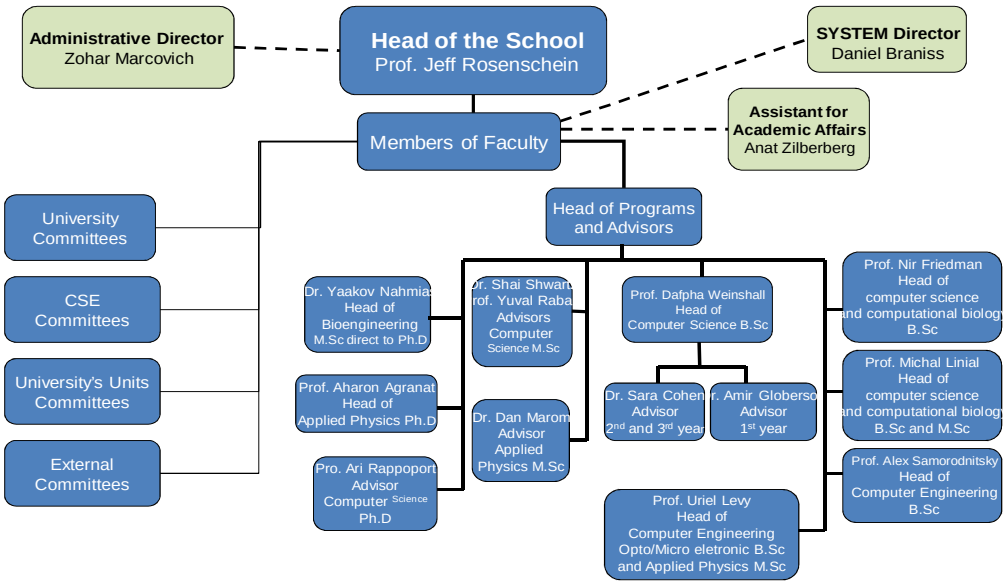
b) HR Office: This office deals with employment conditions, social services, appointments and other issues related to the school staff.

c) Accounting Office: The school's accounting handles the current budget, development budgets and funding. This office works primarily with the Finances Department of the University, the University Accounting, the department of Supplies, and with the Research and Development Authority.

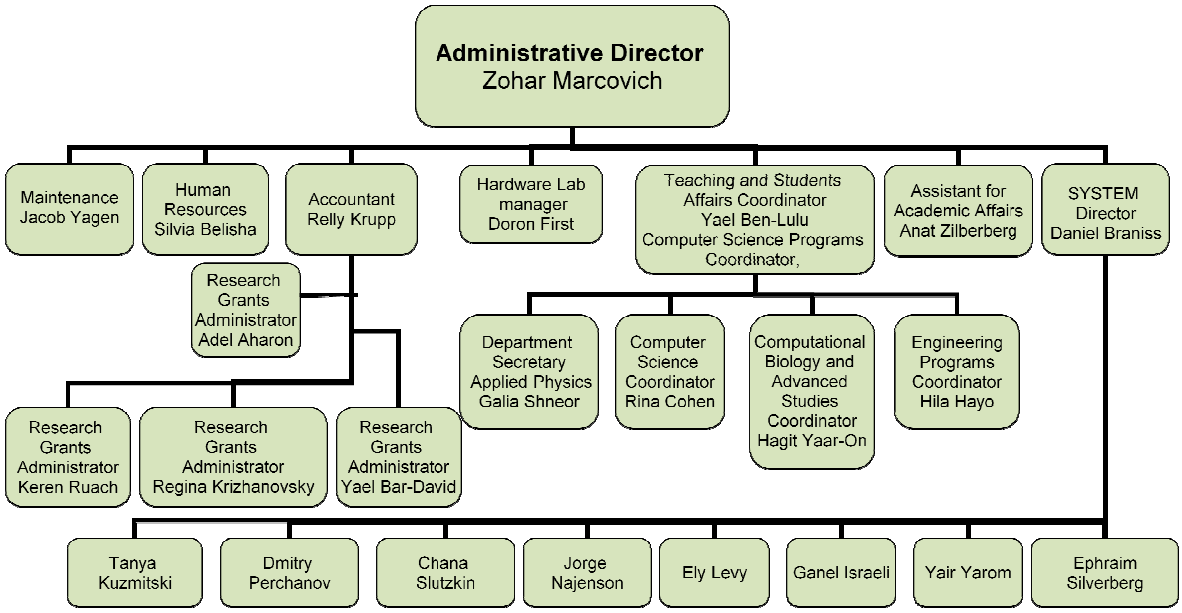
d) Teaching and students Office: This office includes a teaching support secretary and two student support secretaries for computer science students and for computer engineering students. This office receives assistance from the school secretariat in managing the school's program in computational biology, and the support of graduate students. This office works with the Secretariat of teaching and students in the Faculty of Science.

Charts of Unit:

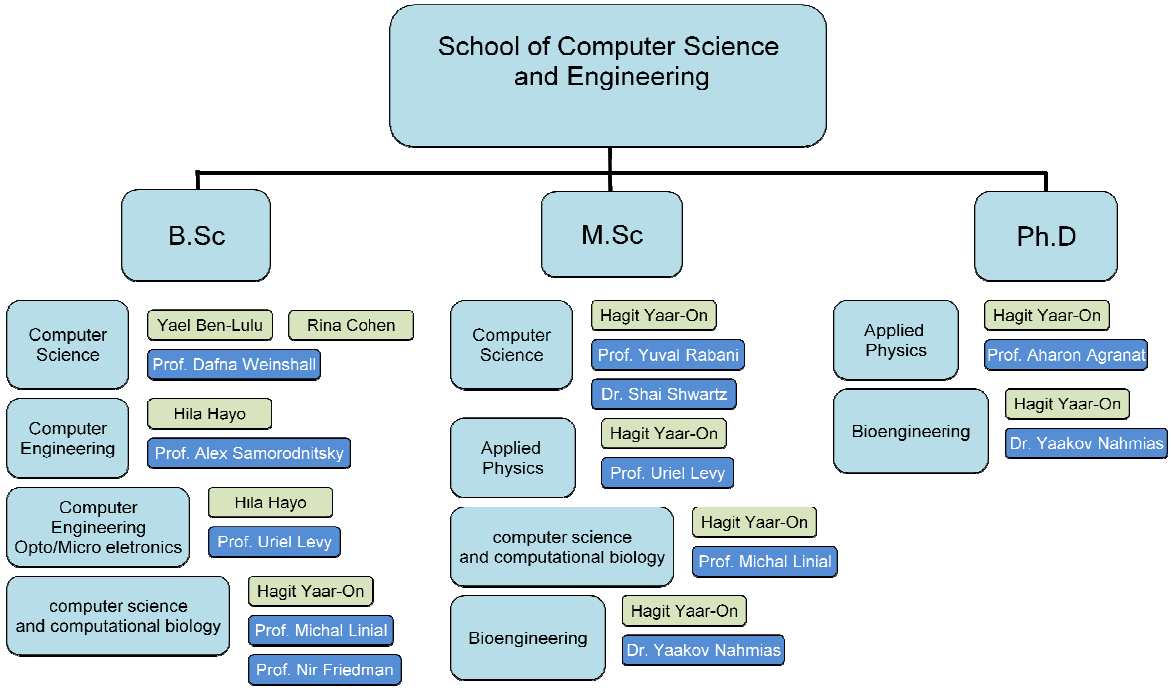
Academic Staff



The Rachel and Selim School of Computer Science and Engineering
Administrative Positions



The Rachel and Selim School of Computer Science and Engineering
Department programs



(Inter-)National Committees:

The Inter University Computation Center
- Prof. Danny Dolev

ERC Scientific Council
- Prof. Danny Dolev

The Israeli Centers of Research Excellence (I-CORE) program
- Prof. Danny Dolev

University Committees

Senate of the Hebrew University
- Prof. Michael Ben-Or
- Naftali Tishby

Standing Committee of the Senate
- Prof. Michael Ben-Or

Academic Policy Committee of the University
- Prof. Michael Ben-Or

University Conference Committee
- Prof. Sara Cohen

The Association for Research Students
- Prof. Yair Weiss

The Authority for Libraries
- Prof. Danny Dolev

University Appointments and Promotions Committee
- Prof. Orna Kupferman

Corner Stone Committee
- Prof. Orna Kupferman

Disciplinary Committee for Academic Staff
- Prof. Orna Kupferman

University promotions Committee for Sciences
- Prof. Daphna Weinshall

Faculty of Sciences & other Committees

Faculty Appointments Committee
- Prof. Jeff Rosenschein
- Prof. Daphna Weinshall

Natural Sciences Curriculum Committee
- Prof. Alex Samorodnitsky

New Candidates Committee, the Faculty of Business Administration
- Prof. Danny Dolev
- Prof. Noam Nisan

Member of the ELSC Executive Committee
- Prof. Naftali Tishby

ELSC Faculty Search Committee
- Prof. Yair Weiss

Cognitive Program Steering Committee
- Prof. Naftali Tishby
- Prof. Eli Shamir

The Authority for Computation, Communication and Information
- Prof. Danny Dolev (Chairman)

Interdisciplinary Center for Neural Computation
- Prof. Naftali Tishby (Director)

CSE Committees

CSE Curriculum Committee
- Prof. Alex Samorodnitsky
- Prof. Daphna Weinshall
- Prof. Jeff Rosenschein
- Prof. Yuval Rabani
- Dr. Shai Shwartz
- Prof. Sara Cohen
- Dr. Amir Globerson
- Dr. Raanan Fattal

CSE Promotion & Search Committee
- Prof. Michael Ben-Or
- Prof. Orna Kupferman
- Prof. Yair Weiss

CSE infrastructure Committee
- Prof. Nir Friedman

CSE library committee
- Prof. Yair Bartal

CSE Building Committee
- Prof. Shmuel Peleg

CSE Awards Committee
- Dr. Ami Wiesel
- Prof. Sara Cohen

Steering Committee for the Brojde Center

- Prof. Michael Ben-Or
- Prof. Danny Dolev

Doctorate Committee

- Prof. Ari Rapaport (Chairman)
- Prof. Yair Bartal
- Prof. Dani Lischinski

3.1.4. Please provide in the format of a table, the number of first year students enrolled as well as the total number of students in the program in each of the last five years according to level of degree (first degree, second degree with thesis, second degree without thesis, doctoral degree)

Degree		**Academic year**				
		2007	**2008**	**2009**	**2010**	**2011**
B.Sc.	Applicants	600	663	746	624	584
	Accepted	236	250	349	282	266
	1st year	141	157	194	176	160
	Total BSc	316	379	459	479	446
M.Sc.	Applicants	85	75	63	82	76
	Accepted	68	54	40	51	62
	1st year	62	52	40	45	59
	Total MSc	155	150	140	150	137
PhD	Accepted	10	15	11	6	11
	Total PhD students	76	85	75	71	71

3.1.5. Please provide in the format of a table, the number of graduates from the program in each of the last five years according the level of degree (first degree, second degree with thesis, second degree without thesis, doctoral degree).

	B.Sc. graduates						M.Sc. graduates										PhD gradates[3]	
			Summa Cum Laude		Magna Cum Laude								Summa Cum Laude		Magna Cum Laude			
2011	**BSc graduates**	**Final grade**	**No. of graduates**	**Minimum grade**	**No. of graduates**	**Minimum grade**	**Research Master**	**Non-research Master**	**Direct track**	**Total M.Sc. Graduates**	**Final grade**	**Thesis grade**	**No. of graduates**	**Minimum grade**	**No. of graduates**	**Minimum grade**	**PhD graduates**	Summa Cum Laude
Faculty of Science	513	86.84	10	96.25	93	91.3	167	36	19	222	91.37		6	98.04	45	94.43	69	
Computer Science	132	87.44	5	96.25	28	91.3	27	21	1	49	93.11	94.22		98.04	22	94.43	11	1
CS & Comput. Biology[4]	14		0		2	91.3	5			5			0	98.04	4	94.43		
CS Section	1																	
2010																		
Faculty of Science	542	86.67	11	97.25	97	91.18	175	19	17	211	91.13		6	96.61	43	93.71	91	
Computer Science	113	86.67	2	97.25	19	91.18	27	5	1	33		93.07	1	96.61	11	93.71	12	1
CS & Comput. Biology	11						2			2			0		1	93.71	1	
CS Section	10																	
2009																		
Faculty of Science	505	86.68	10	96.85	91	91.31	129	23	16	168	90.7		5	97.28	33	93.78	75	
Computer Science	84	87.26	6	96.85	15	91.31	18	11	0	29	92.17	94.27		97.28	13	93.78	11	2
CS & Comput. Biology	15		0		4	91.31	0										1	
CS Section	5																	
2008																		

[3] Summa Cum Laude for Ph.D. has been cancelled 2 years ago

[4] Details about the CS and Computational biology program are given in Section 3.2.1.

Faculty of Science	475	86.45	9	95.98	86	91.04	154	17	26	197	91.32		5	98.24	38	94.11	83	
Computer Science	74	86.66	4	95.98	16	91.04	20	5	3	28	92.32	93.27	1	98.24	7	94.11	13	0
CS & Comput. Biology	10						2			2			0		2	94.11	0	
CS Section	8																	
2007																		
Faculty of Science	480	87.28	10	97.16	86	92.12	144	10	22	176	90.93		5	97.12	34	93.81	69	1
Computer Science	96	87.58	2	97.16	21	92.12	13	7	1	21	91.93	92.61	2	97.12	2	93.81	11	1
CS & Comput. Biology	11				3	92.12	2	0	0	2			1	97.12			1	
CS Section	7																	

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). 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?

Name of Study Program	Name of the Degree	Campus
Computer Science Single track	B.Sc. in Computer Science	Edmund .J. Safra
Computer Science Double track	B.Sc. in Computer Science	Edmund .J. Safra
A combined program in Computer Science and M.B.A. (Masters of Business Administration)	B.Sc. in Computer Science	Edmund .J. Safra
Section in computer science		Edmund .J. Safra
Computer Science and Computational Biology	B.Sc. in Computer Science and Computational Biology	Edmund .J. Safra
M.Sc. in Computer Science (research track)	M.Sc. in Computer Science	Edmund .J. Safra
M.Sc. in Computer Science (non-research track)	M.Sc. in Computer Science	Edmund .J. Safra
M.Sc. in Computer Science and Computational Biology	Master of Science in the Dept. of Computer Science and Computational Biology.	Edmund .J. Safra
Ph.D. in Computer Science	Ph.D. in Computer Science	Edmund .J. Safra

Computer Science (single major)

Structure of study program

Computer Science	
	Credits[5]
Mandatory courses in CS	49
Elective courses in CS	4-5
Optional courses in CS	26-27
Total in CS	**80**
Mandatory courses in Math	30
Total in CS	**110**

Computer Science	110
optional	24[6]
Total credits in the Faculty of Science	**134**

[5] Each credit point correspond to one hour of study in one semester
[6] It is required to study 8 credits from "Avney Pina" course

Computer Science (double major)

Structure of study program

Computer Science		The 2nd department studies
	credits	Credits
Mandatory courses in CS	49	
Optional courses in CS	11	
Total in CS	**60**	
Mandatory courses in Math	30	
Total for BSc in CS	**90**	**44-54**

Total for BSc in faculty of Science	**134-144**

Computer Science and computational biology

Structure of study program

Computer Science and computational biology		
		Credits
Basic courses in sciences	mathematics	24
	physics	10
	chemistry	16
Toal basic courses in sciences		**50**
Courses in life sciences		38
Courses in computer science		45
Courses unique to the program		26
Total for BSc in CS with Section in life sciences		**159**

Total for BSc in faculty of Science	**159**

Section in Computer Science

The section in computer science is intended, first and foremost, for students studying mathematics and physics, but is open to any student who qualifies. The qualification requirements and the section study program are detailed in the course catalog. Excelling students who have taken the Section courses in their first year, and meet the requirements, can switch to the computer science program in their second year.

The prerequisite courses:

1. INFINITESIMAL CALCULUS (1)/ APPLIED MATHEMATICS (1)/ Calculus for Engineering and science students
2. LINEAR ALGEBRA (1)/ LINEAR ALGEBRA (2)/ LINEAR ALGEBRA FOR PHYSICISTS
3. DISCRETE MATHEMATICS
4. PROBABILITY THEORY(1)/PROBABILITY THEORY AND APPLICATIONS

The total credits in this Section is 32 points.

Computer Science	
	Credits
Mandatory courses in CS	19
Elective courses in CS	4-5
Optional courses in CS	8-9
Total	**32**

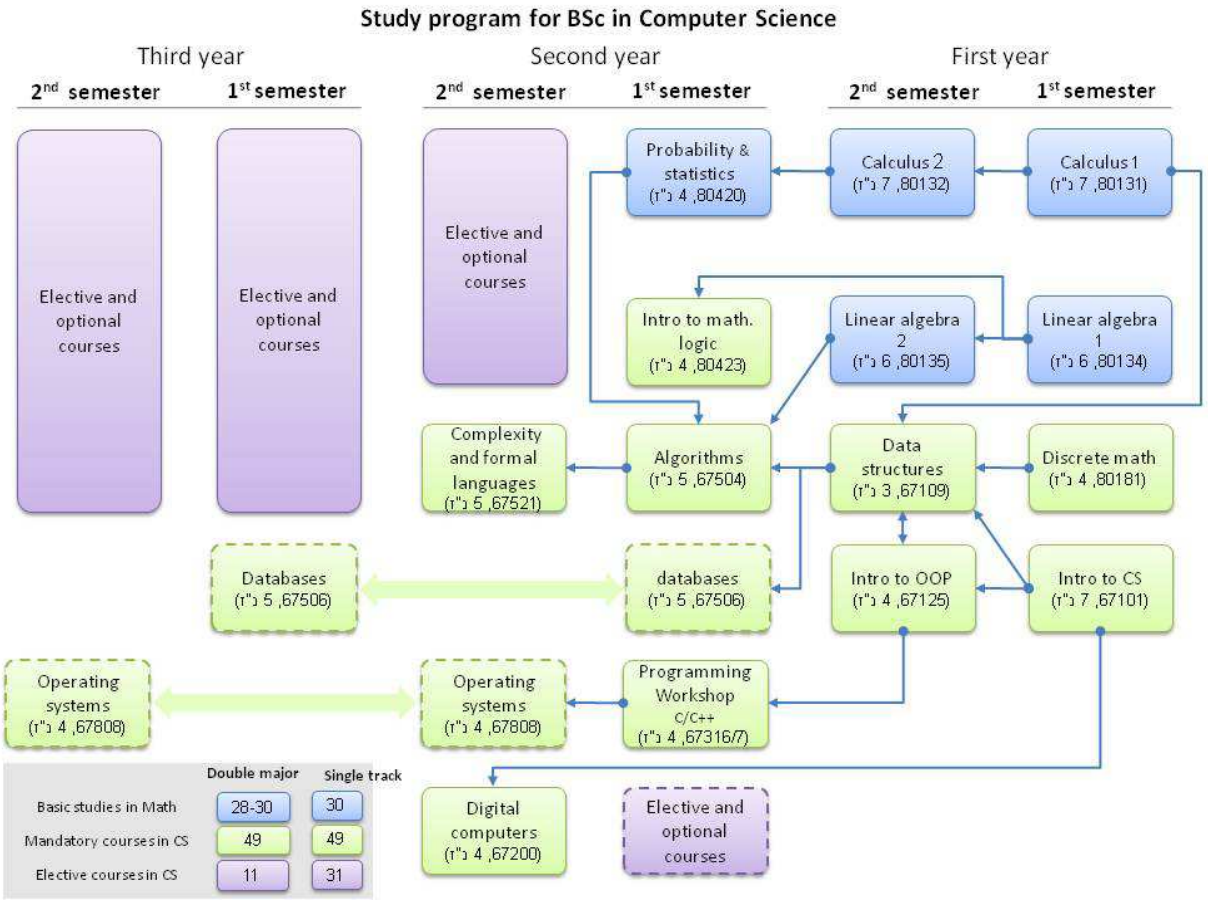
Computer science program for MSc

1. **Research track (with thesis)**
2. **Non research track (without thesis)**

Structure of studies

	M.Sc. with thesis	M.sc. without thesis
	credits	Credits
Mandatory courses in CS	4	4
M.Sc. final exam	0	0
Elective courses in CS	9	9
Seminar	2	2
Lab. project	5	5
Optional courses in CS	10	25
Total	**30**	**45**

Study programs summary:



3.2.2. Please provide in the format of Table 7.1 (page 14) the structure of the study program its content, and scope (years of study, semesters, hours per year and credits) and the distribution of the studies throughout the academic year. Does the study program supply courses to other units?

See Appendix 7.1. The study program does not provide service courses.

3.2.3. 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 study program is planned and managed by the School's Curriculum Committee. The Curriculum Committee is chaired by the Head of the Computer Science program. Other members include academic consultants for the various years and all school programs. The Curriculum Committee convenes several times in the course of the academic school year, and the meetings are open to all of the School's faculty. The Head of the Computer Science program decides upon the agenda of each meeting, the topics on the agenda are discussed, and any proposed changes in the study program are brought to a vote before the school general assembly before they become effective. No fundamental change has been introduced into the program in the last five years.

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

The contents taught in the study program are routinely re-examined by the Curriculum Committee. Beyond this, coordination of content between courses that directly continue each other is the responsibility of the course teaching staffs. For example, the staffs of the first year's mandatory computer science courses coordinate among themselves to ensure that there are no gaps between the material covered in the first semester (in the course Introduction to Computer Science) and that covered in the second semester (in the courses Data Structures and Introduction to Object-Oriented Programming).

3.2.5. Are 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 the Business School and the Manufacturers' Association or Industrial Factories)?

No non-academic bodies are currently involved in the running or the activities of the School or its study program. Some courses are given with the help and/or participation of non-academic bodies. For example, the teacher of the course Computer Architecture is a senior architect at Intel. However, the syllabus of the course is supervised by the School's Curriculum Committee.

3.2.6. To what extent does the department collaborate with other departments within/outside the institution?

By offering a double track program towards a B.Sc. degree in Computer Science, our School makes it possible for students at the Hebrew University to study computer science along with another discipline of their choice. Beyond this, students in other programs who are not interested in taking a full degree program in computer science are able to study a "Section in computer science".

The School's students are required to take a number of courses offered by other departments, such as math courses offered by the Mathematics department, and a course in Probability and Statistics offered by the Statistics department. The latter course was designed in collaboration with the Statistics department, specifically to address the curriculum needs of computer science students.

Our faculty members are deeply involved in interdisciplinary research with other groups within and outside the institute, see description of research centers in Section 4.2.

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

As explained earlier, the study program is constantly monitored and re-evaluated by the School's Curriculum Committee. There are no immediate plans to introduce any large scale changes in the program, however, small scale adjustments occur almost every academic year. As mentioned earlier, any significant changes are discussed and voted upon at the Curriculum Committee's meetings, and subsequently at the school's general assembly. Changes involving creation of new tracks or specializations are also brought up for discussion and approval by the Faculty of Mathematics and Natural Sciences.

For the coming academic year 2012-2013, we are going to introduce the following changes:

- Make the course *workshop from Nand to Tetris*, mandatory, while two mandatory courses – databases and computer architecture – will become elective.
- Increase the requirement of elective courses to 16 credit points (from 4 in the present program), with an expanded list of elective courses.
- Test an initiative to offer some of the first and second year mandatory courses in both the first and second semesters. This will allow students more flexibility, and lower the burden in the first year.
- Change the format of the M.Sc. exam to focus on the student's area of research.

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

In summary, the existing study program offers a variety of tracks where students interested in top-notch computer science education can fulfill their needs. The admission to the program is highly competitive, the studies are challenging and demanding and our graduates are able to quickly find their place in Israel's high-tech industry. Those of our students who are interested in continuing their education and in research are able to do so by enrolling into our M.Sc. and/or Ph.D. program.

Among the strengths of our program is the level of the mathematical and theoretical computer science education offered to our students. Another strength is the fact that our School belongs to an institution with numerous other excellent departments and programs. Within the computer science study program itself there is a wide variety of advanced elective courses, taught by leading researchers in their respective fields, thereby exposing students to the state-of-the-art research in these fields.

A weakness of our study program is that it does not cover certain areas in computer science, such as theory of programming languages and compilers.

To this section, please attach the following information:

- **The full study program in the format of Table 7.1 (that appears in chapter 7 of this document on page 14)**

Attached in 3.2.2.

- **Copy of the diploma awarded upon completion of studies (including any appendices to the diploma, such as Diploma Supplement).**

THE HEBREW UNIVERSITY OF JERUSALEM

The Dean and the Council of the Faculty of Mathematics and Natural Science

hereby confer on

XXXXX XXXXXXX

the degree of

BACHELOR OF SCIENCE
upon successful completion of the required course of studies

in the Departments of

COMPUTER SCIENCE (comprehensive courses)

Magna cum Laude

in witness whereof I hereby append my signature

Jerusalem, 2012

(-)
Dean

THE HEBREW UNIVERSITY OF JERUSALEM

The Dean and the Council of the faculty of Science

Hereby confer on

XXXX XXXXXX

the degree of

MASTER OF SCIENCE

upon completing the required course of studies

in the department of

COMPUTER SCIENCE

In witness whereof I hereby append my signature
Jerusalem , 2012

(-)
Dean

3.3. Teaching and Learning Outcomes

3.3.1. Does the Department have a structured system for evaluating teaching? If 'yes', please specify what the process includes. How are the results of the evaluation activities used, specifically, the negative findings about faculty members' teaching?

- **How does the unit foster excellence in teaching? How are excellent teachers rewarded?**
- **Does the institution have a center for the enhancement of teaching? If not, does the institution / unit / department offer the teaching faculty systematic activity, such as courses/in-services/training/instruction and guidance programs in order to improve the quality of teaching?**
- **Do new faculty members receive special support? Does the department have a mentoring program for new faculty? If 'yes' – please specify.**

The school does not have a separate system for teaching evaluation. Rather, we are using the system that is provided by the University. As the term is nearing its end, students are requested to go online and evaluate the courses that they take. The University encourages students to participate in the process by holding a raffle among those who respond. Outstanding teachers are publicly acknowledged. Each term the list of outstanding teachers is posted in very visible posters throughout the HU campuses. These teachers also receive a letter of congratulation from the University's president and rector. In addition, the list of outstanding teachers is available to all of HU's students and faculty. Teachers with particularly low grades receive a letter from the president and the rector. If such incidences reoccur, the relevant teacher is usually invited to a discussion with the dean. The head of the computer science program knows the different faculty's teaching skills. This information is taken into account when making teaching assignments to the school's teaching staff.

In the last couple of years we have been offering our teaching staff a course in teaching methodologies. This kind of activity seems to be constantly expanding. The impression is that the HU management views such activities very positively, so it is safe to assume that we will be seeing more and more classes and personal tutoring geared to improve faculty's teaching skills. These activities are presently focused more on junior faculty - mostly teaching assistants, but some classes of this sort are being offered to senior faculty as well.

It has been the school's policy for many years to try and help new faculty members in many different ways. In the area of teaching, new faculty are not assigned ``heavy'' courses, i.e., classes with numerous students or classes which are known to be hard to teach for various reasons. The usual practice, then, is that in their first year here, new faculty teach almost exclusively subjects that are within their own specialty area. The first time that a new faculty member is requested to teach a mandatory course comes when the person is up for promotion. The university's promotion committees insist on having a full teaching record which must include some teaching of large mandatory or elective courses.

The Hebrew University has a mentoring system for new faculty, see
http://academic-secretary.huji.ac.il/.upload/MoreMelave.pdf. In addition, due to the good atmosphere within the department, most of the new faculty feel free and are encouraged to consult with their more senior peers. Also, it is quite common that more senior faculty share resources with the junior faculty. This applies to lab resources, computation facilities and funds. The general impression is that junior faculty feel very welcome and supported by the department.

3.3.2. Please provide in the format of Table 7.3 (page 18) as an appendix to the report, the rankings of the courses as found in the results of the teaching surveys given by the program in the last 5 years (those of faculty members and those of adjuncts). Please divide the information by obligatory courses, electives, seminars, and labs/workshops. Please specify any other methods of evaluation.

See appendix.

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

Every course in our school has its homepage. All such homepages are accessible through the school's main homepage. The content of these course pages varies from class to class, but they usually provide a very rich

and useful resource to the students. They typically include lecture notes by the teacher and by the TA's, often including a copy of the slides used during the lectures. There are often links to past versions of such lecture notes, to lecture notes from other institutions and to printed material. Such a homepage usually offers a number of very useful forums for discussions among the students as well as means of communication with the course's teaching staff. This is supported by the computerized moodle environment.

3.3.4. Learning Outcomes[7]

3.3.4.1. What are the program's intended Learning Outcomes (LO)? How were they set and where are they stated?

Generally speaking, it has always been the school's attitude that fundamental scientific principles are the main focus of our teaching program. In a dynamic and fast-evolving discipline such as computer science, there is very little point in teaching the details of a currently popular system. This approach must, of course, be taken in moderation. We do want to make sure that our students can compete in the marketplace when they receive their degree here. We are also convinced that an overly theoretical curriculum does not serve our students well and we keep updating and improving our classes.

Thus our whole program is examined regularly by our faculty and modifications are made according to the field's evolution and the changing requirements. We always seek the correct balance between solid theoretical foundations and practical skills, as explained above. Since solid theoretical foundations tend to evolve slowly, the respective courses remain largely unchanged over time, slowly adapting to the changing state of the art. Relevant practical skills, however, may change rather quickly, and our program tries to keep up. For example, this year we have offered for the first time a programming course in Python, which is emerging as an important computer language. Another recently introduced course deals with the transition of computing to small devices such as mobile phones and the Android operating system. Other courses introduce the students to the current world of internet in various ways.

3.3.4.2. Are LO defined in the course syllabi?

In some courses, the LO are defined in the syllabus, but this is not a requirement.

3.3.4.3. Describe the methods applied to measure Learning Outcomes according to the following:

3.3.4.3.1. Examinations and exercises

a. **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.).**
b. **Who writes the examinations and exercises and how is their validity assessed?**
c. **Who grades the examinations and exercises? Please describe the feedback given to students, apart from the grade.**

There are many different methods that are being used in our various classes. The most common is a final written exam that usually lasts 2.5 hours. This is done in a standard format that is common to the whole university. In most classes students are required to submit homework. Such assignments are typically given either weekly or bi-weekly. Their contents and format vary according to the character of the class and its subject-matter, from theoretical questions to computer programming problems. Certain classes adopt other strategies. In some classes (mostly more advanced, smaller classes) teachers opt for a take-home exam. Students are given several days to solve a list of problems. Also, in some classes homework is graded during an interview with a TA; interviewers are usually M.Sc. Students.

Generally speaking, homework assignments and final exams are composed jointly by all of the course's teachers. Typically the TA's and the course's lecturer meet regularly to discuss these matters. Homework grading is usually done by a team of M.Sc. Students that are assigned to the job. Final examinations are usually graded jointly by the course's teacher and the TA's. In smaller more

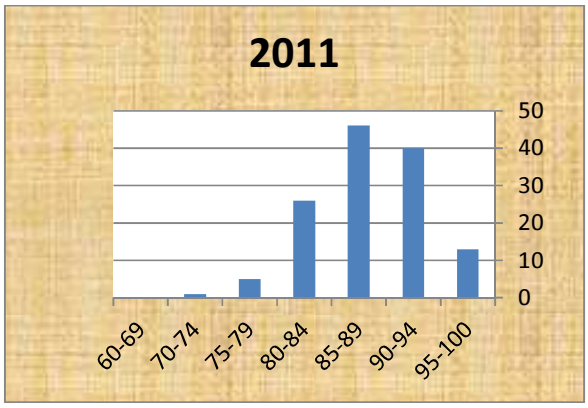
[7] Definition of learning outcomes established by the Bologna working group on qualifications: ***"LO are what a learner is expected to know, understand and/or be able to do at the end of a period of learning."***

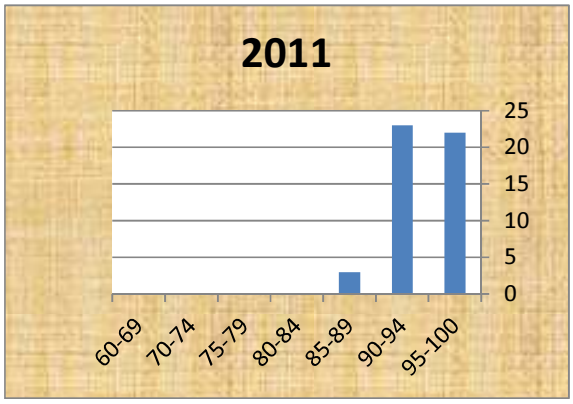
advanced classes there are usually no TA's and the course's teacher is in charge of all these chores: Composing and grading homework assignments, projects and final exams.

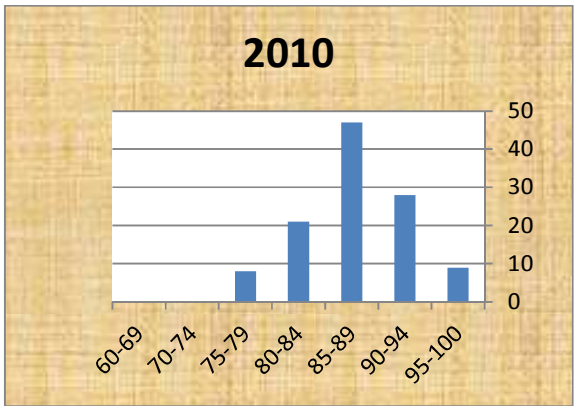
d. Please provide in the format of a histogram how the final grades are distributed in all study programs and all degree levels in the last 3 years.

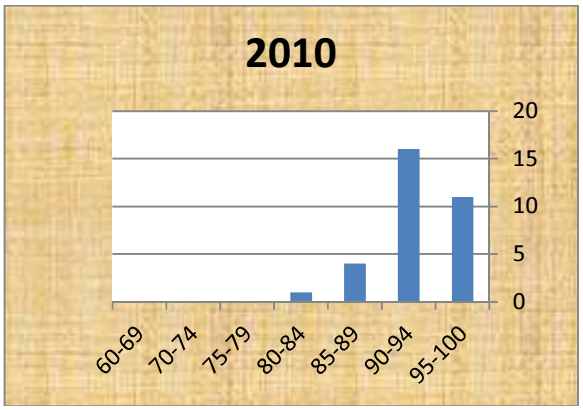
Final grades distribution

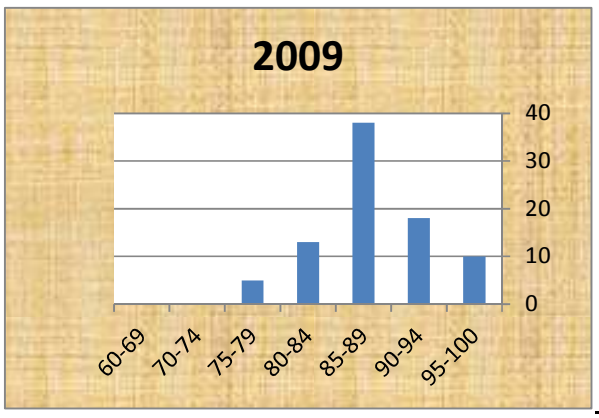
BSC **MSC**

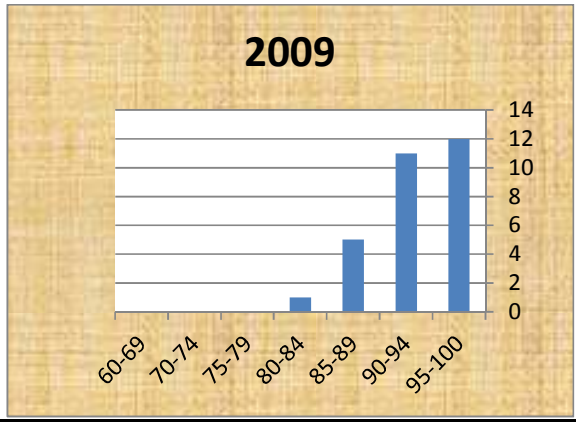












3.3.4.3.2. Written assignments (seminar papers, projects, theses, dissertations, etc)

a. Describe the types of written assignments and other projects required in the program, their contents and scope.
b. Who writes the assignments and how is the validity of the assignments assessed?
c. Who grades the written assignments?
d. What methods are applied to evaluate written assignments and projects? What kind of feedback, apart from the grade, is given to the students?
e. 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.

In certain, relatively few classes, students' achievements are evaluated based on projects which are graded by the course teachers. There are also quite a few seminars that are being offered, where students are assigned research papers to read and present before the class. Those are intended mostly for graduate students, although a certain fraction of our undergraduate students are attending these seminars as well. M. Sc. Students are required to take one or two seminars in their course of study. These seminars tend to be dedicated to topics of current interest and activity in the forefront of research. Final MSc or PhD thesis is evaluated by the supervisor and 1 (for MSc) or 2 (PhD) additional readers, who provide written comments to the student.

Graduates BSc and MSc - Computer Science

2011		Bsc	Final Grade	Num of Outstanding Excellence	Threshold	Num. Excellence	Threshold	MSc Thesis	MSc NonThesis	Direct	Total MSc	Final Grade	Final Work Grade	Num. Outs. Excellence	Threshold	Num. Excellence	Threshold
Faculty Science		513	86.84	10	96.25	93	91.3	167	36	19	222	91.37		6	98.04	45	94.43
Dept.	521	132		5	96.25	28	91.3	27	21	1	49		94.22		98.04	22	94.43
2010		Bsc	Final Grade	Num of Outstanding Excellence	Threshold	Num. Excellence	Threshold	MSc Thesis	MSc NonThesis	Direct	Total MSc	Final Grade	Final Work Grade	Num. Outs. Excellence	Threshold	Num. Excellence	Threshold
Faculty Science		542	86.67	11	97.25	97	91.18	175	19	17	211	91.13		6	96.61	43	93.71
Dept.	521	113		2	97.25	19	91.18	27	5	1	33		93.07	1	96.61	11	93.71
2009		Bsc	Final Grade	Num of Outstanding Excellence	Threshold	Num. Excellence	Threshold	MSc Thesis	MSc NonThesis	Direct	Total MSc	Final Grade	Final Work Grade	Num. Outs. Excellence	Threshold	Num. Excellence	Threshold
Faculty Science		505	86.68	10	96.85	91	91.31	129	23	16	168	90.7		5	97.28	33	93.78
Dept.	521	84		6	96.85	15	91.31	18	11	0	29		94.27		97.28	13	93.78

3.3.4.3.3 Training and field work

a. **Describe the training/field work required in the program, their contents and scope.**
b. **What methods are applied to evaluate training/field work? What kind of feedback is given to the students?**

Field work in the field of computer science would typically require the student to design and build a large programming project, using any computation device – from super computers to smart phones. Our first obligatory training course is given in the second semester of the first year – *introduction to object oriented programming*. In the first semester of the second year, students are required to take *programming workshop in C and C++*. In the elective course *workshop from Nand to Tetris*, students experience the (logical) building of a computer in a set of pre-defined steps. Quite a few optional courses involve a final project on state of the art devices, such as GPUS (*high performance computing on GPUs*) and smart phones (*Post PC computing*). The annual course *Hi-tech Entrepreneurship* is dedicated to entrepreneurship.

3.3.4.4. Please specify the number of graduates who graduated with honors.

See Section 3.3.4.3.2, above.

3.3.4.5. Other - any other methods applied to measure the achievements of the students.

The majority of our classes are given in the standard frontal format. Namely, a class is given by a professor to a large number of students. Lectures are complemented by recitation sessions given by TAs, who are usually Ph.D. students. Homework is assigned weekly and graded by graders who are usually M. Sc. Students. In some courses a few short quiz exams are given throughout the semester and a written final exam at the end of the semester. The final grade is a weighted average of all these ingredients: Final exam, homework, and quizzes. As mentioned, there are various variations on this basic pattern (e.g., take-home exams).

3.3.5. In summary, to what extent have the methods applied to measure the teaching and learning outcomes achieved their goals? Do you think that the intended LO were achieved by the students?

The whole study program serves as a constant evaluator and monitor of its own success. Various classes are required (both formally and informally) as prerequisite to our advanced classes. Such courses cannot be completed successfully unless the student has profoundly mastered the more basic and fundamental concepts. Our study program carries a good deal of depth in this sense. The very fact that the large majority of the students do pass our advanced classes is good evidence to the fact that they have indeed internalized and deeply understood the material taught in the basic obligatory and elective courses.

Please attach in the form of Table 7.3 (page 18) the rankings of the courses as found in the results of the teaching surveys given by the program in the last 5 years to this section (faculty members as well as adjuncts). Please divide the information by mandatory courses, electives, seminars and labs/workshops.
To this section, please attach the following appendix on a CD: 5-10 examples of Thesis; 5-10 examples of Dissertations (and relevant publications); 5-10 examples of final projects.

See Appendix and attached CD, folder HUJI_Exemples_1_7_2012.

3.4 Students

3.4.1 What are the entry requirements/criteria for the program and the <u>actual</u> admission data (first degree and advanced degrees), including the "on probation" status.
Please submit data concerning the number of applicants, admitted students, and enrolled students in the program in the last five years (divided by degree) as follows:

Entry to the program depends primarily on the average between the matriculation grades and the psychometric score. Applicants are also required to pass the minimal, university-wide requirements in terms of English and Hebrew proficiency. Students who already have a record of study in higher education (at other universities, or in the preparatory colleges of the Hebrew University or another university) can opt to use their grade averages in higher education instead of the matriculation grades. We also offer the possibility of "direct entry" without matriculation and/or psychometric grades. Students with a Ph.D. can enter without psychometric scores, and so can students with very high matriculation scores (above 11.25). Similarly, students with psychometric scores above 740 can enter regardless of their matriculation grades (provided they are qualified for matriculation).[1] Foreign students are required to show their high school grade average instead of the matriculation grades. Foreign students can also present grades from preparatory colleges or higher education abroad. If the preparatory college was performed at the Hebrew University, the grades are averaged with the psychometric grades. In case of other preparatory colleges, only the psychometric grade is taken into consideration.

a. The number of candidates that applied to the program, the number of admitted students, the number of students that began their studies, and the number of students that completed their studies, including those admitted "on probation".

Degree		**Academic year**				
		2007	**2008**	**2009**	**2010**	**2011**
B.Sc.	Applicants	600	663	746	624	584
	Accepted	236	250	349	282	266
	1st year	141	157	194	176	160
	Total BSc	316	379	459	479	446
M.Sc.	Applicants	85	75	63	82	76
	Accepted	68	54	40	51	62
	1st year	62	52	40	45	59
	Total MSc	155	150	140	150	137
PhD	Accepted	10	15	11	6	11
	Total PhD students	76	85	75	71	71

b. What are the de facto admission criteria for the program? If there is a discrepancy between the admission criteria and the de facto admission data please specify.

The de facto admission policy is the same as above.

<u>Criteria for admission to BSc</u>

- Eligibility for high-school matriculation
- Psychometric test
- English level – meeting University level standard (Level 3 up to 2009, Level 2 since 2010)

[1] The maximum possible matriculation grade is 12, and the maximum psychometric score is 800 (average=530, sd=110).

- Hebrew level – meeting standard level for students whose high-school's main language was not Hebrew.

These criteria are required for candidates for first year of first degree in all University curricula, and have been chosen in order to find and accept the candidates with highest potential to succeed in their studies.

- Matriculation exams in a scientific subject, on top of Mathematics, at a level of 2 credit points at least – is required for acceptance up to 2009. Since 2010 this requirement has been dropped.

Acceptance Process

The acceptance process is based on weighting the average grade of the matriculation diploma with the Psychometric score. Candidates with a weighted average which is higher than a fixed threshold are accepted, where the threshold is set (in part) based on the number of available spots.

Prior further education – data on previous academic achievements (pre-academic preparatory class of the Hebrew University, or Tel-Aviv; previous academic studies) may replace the matriculation diploma average when computing the weighted average. For a candidate with several studying achievements, the best weighted average will be computed.

Another channel of acceptable is "direct acceptance" – acceptance without combining the two components. Candidates with a Ph.D. can be accepted into computer science without a psychometric exam. Also, candidates with a high matriculation diploma average (10.9 up to 2009, 11.25 from 2010) can be accepted without a psychometric exam. Alternatively, those with a high psychometric exam (750 up to 2009, 740 from 2010) can be accepted without averaging their matriculation diploma (as long as they are eligible for a matriculation diploma).

Foreign students are required to have a finishing diploma from their high-school which is equivalent to an Israeli high-school matriculation diploma, or to have undergone studies at a University preparatory class for immigrants, or academic studies in their country of origin. Another university immigrants preparatory class is recognized for equivalence, but the final grade is not averaged with the psychometric exam, and the averaged score of the graduates of such preparatory classes is based on their psychometric score alone.

A candidate is allowed to list 4 schools by rank. The classification is done by order of listing. If a candidate has listed CS as first priority and has been accepted, the next request that may be undertaken in a double track with CS is considered. Other requests are not considered. If a candidate has not been accepted into a track he/she has chosen as first priority, their request to be accepted into the second priority is considered, and so on. If no decision has yet been made regarding the track chosen in first priority, the acceptance into second priority is checked. If a student has been accepted into the track chosen as second priority and is later accepted into first priority, his/her acceptance into second priority is canceled, and so on. Hence, there are candidates who have been accepted into CS at an early stage, but at a later stage their acceptance is canceled due to having been accepted to a track listed at a higher priority.

A candidate whose records do not allow acceptance following standard procedure but has sufficient further relevant data may appeal for reconsideration. These requests are brought before an appeal committee. This refers to a small number of candidates each year (and in some years, none).

As a rule, there is no "conditional" acceptance (conditioned by available spots), except in extreme cases in which the appeal committee approves acceptance for a candidate and sets a condition based on his/her personal records and state.

Affirmative action

Since 2002 the university has an affirmative action channel for all departments, including CS. Candidates for a department recognized as worthy of affirmative action based on the criteria set by the "Aguda leKidum HaChinuch" (the Association for the Advancement of Education) can be accepted if their weighted average is slightly lower than the level required to be accepted, based upon the number of spots allocated to this population.

Candidates with special needs

Candidates with different disabilities (hard of sight, blind, hard of hearing) may take the psychometric exam on special terms, befitting their conditions. If they do not meet the usual criteria they may submit an appeal to the Appeal Committee, adjacent to Student Affairs.

Detection of excellent students and compensating them

Accepted new first year students to the university with exceptionally high track record are eligible for excellence awards. The screening procedure is done when sending the acceptance notifications. Students in the single major program are eligible for a full exemption from tuition. Until 2008, students in the double major were eligible for an exemption of half of the tuition, and the full tuition if they were also eligible for award when considered by their other track. Since the academic year 2008, eligibility for faculty award in one department awards the full exemption. Additionally, since 2008 a small number of first year students, with exceptionally high acceptance scores, receive an excellence award and exemption from half the tuition. All recipients of these awards must be full time students participation in a full study program.

Financial Aid

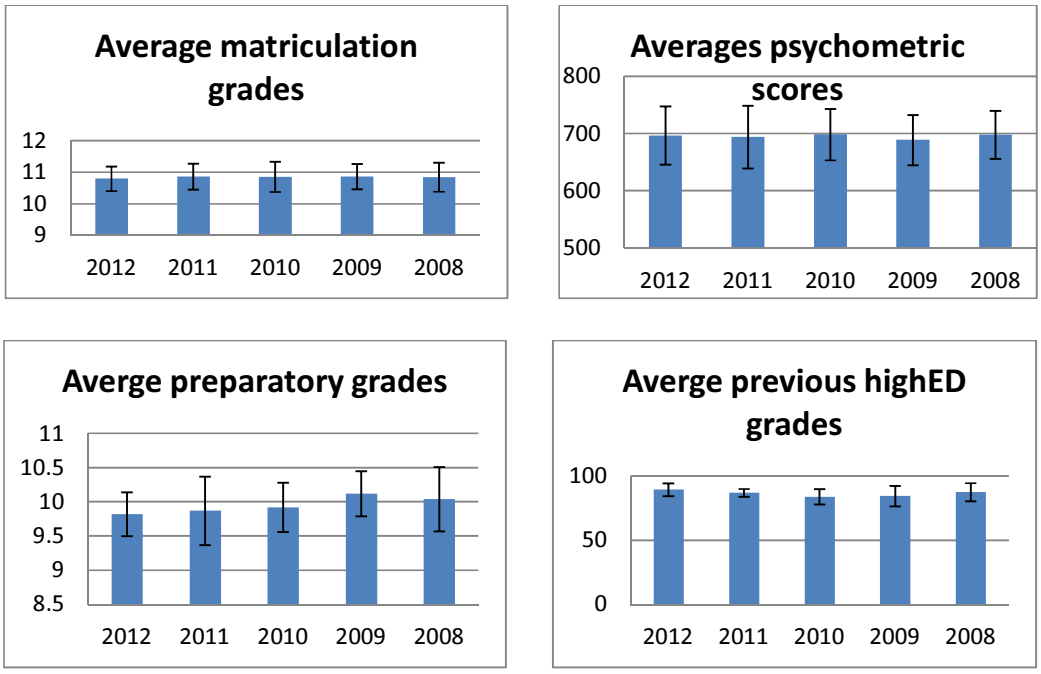
BSc students are eligible for financial support for living costs based on their academic achievements and their financial situation. The size of the scholarship changes depending on the student's financial status and academic achievements. First year students are rated by the average of the matriculation diploma grades and their psychometric score to measure their academic performance. The student/recipient must fill out a form to request the scholarship for financial support. This request is considered by the Aid Division of Student Affairs division, and the answer is sent to the student/recipient.

Relationship between Student Achievements and Opening Records

The office of admission and evaluation occasionally performs evaluation tests of the procedure of selecting candidates. The relationship between the components of acceptance and the academic achievements is examined (failure, success, grade average). Further examined is the relative weight each component should be allocated in order to improve the prediction of academic success. These examinations are done over several academic years in order to ensure the stability of the findings. The results are brought before a professional committee which includes experts from Psychology, Statistics, and Education. In accordance with the results, the committee establishes a recommendation on whether the sorting and acceptance process should be changed, and how. This recommendation is discussed with the evaluated unit, and a joint decision is made regarding the change.

c. In the format of a histogram, please present the range of psychometric test scores or the equivalent as well as the range of matriculation averages of the students that were admitted to the program in the last five years.

Grades average and std of accepted students for first year



d. Data regarding the alumni of the programs (in all levels): E.g., the number of students who continued on to advanced studies, employment data.

We have only incomplete data regarding our alumni (see 3.4.9); out of close to 100 participants who had answered our survey most continued to work in the industry, and 13 continued to higher degrees and academic career. For complete details see folder Huji_Alumni_1_7_2012 in CD, table 3.4.1.

3.4.2 Describe the selection and admission process, 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 data (psychometric score and matriculation grades) for the program?

The requirements for completing the various B.Sc. and M.Sc. programs are detailed in the tables in section 3.2.2 above.

Our requirements for advancing from year-to-year are based on the requirements of the faculty of sciences: failing less than 3 mandatory courses and an average of at least 55 if the student has not failed any mandatory course, 60 if the student has failed one mandatory course, or at least 70 if the student has failed two mandatory courses.

Since 2002, the university has an official affirmative action policy and the CS department follows this policy. Applicants who fit the criteria of the national association for advancing education can be admitted even if their average grades are a bit lower than the threshold. Applicants with special needs can receive special conditions in the psychometric exam. If they do not pass the admission threshold, they may appeal to the appeals committee of the university. The admission threshold is determined by

the department according to the goals of the program of studies. The lowest threshold we have had is a combined score of 22.

3.4.3 What are the de facto criteria for advancing to the next year in the program as well as the criteria for completion of the degree, including the graduation requirements?

The de facto criteria are the same as above.

3.4.4 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? If not, what steps does the unit take in order to prevent, reduce or increase drop-out?

Computer Science

Academic year	1st year	Academic year	2nd year	Drop-out rate	Academic year	3rd year and 4th
2007	141	2008	115	18.4%	2009	136
2008	159	2009	129	18.9%	2010	152
2009	197	2010	143	27.4%	2011	169
2010	176	2011	118	33.0%	2012	170
2011	160	2012	125	21.9%	2013	--

Computational Biology

Academic year	1st year	Academic year	2nd year	Drop-out rate 1st-2nd year	Academic year	3rd year and up
2006	24	2007	16	33.33%	2008	14
2007	27	2008	22	18.52%	2009	19
2008	27	2009	16	40.74%	2010	18
2009	23	2010	11	52.17%	2011	16
2010	26	2011	18	30.77%	2012	21
2011	16	2012	8	50.00%	2013	--

The predominant reason for dropping out is difficulty in mastering the obligatory mathematics courses. We believe that indeed students who cannot pass the mathematics courses will not be able to master the theoretical courses that are obligatory in the program, are therefore not suitable for our program. In order to confront this problem, we are now offering a preparatory course in math for new students during the last few weeks of August and September.

3.4.5 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?

Students in the B.Sc. program can complete independent research projects with faculty members. In the computational biology program, all students are required to complete a research project. The following table lists these projects:

Projects of BSc students

Tutorial project with staff members

	Credit	academic year 2007	Academic year 2008	Academic year 2009	Academic year 2010	Academic year 2011
		No. of students				
Tutorial work	2	4	8	5	3	3
Tutorial work	4	4	4	5	7	4
Tutorial work	6	4	5	5	5	5

Final project of Computational Biology students - Computational Methods Molecular Biology Lab. Project

	Credit	academic year 2007	Academic year 2008	Academic year 2009	Academic year 2010	Academic year 2011
		No. of students				
Project	8	10	15	16	12	9

3.4.6 Counseling systems:

3.4.6.1 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.

Students have faculty advisors according to the following table:

Academic Counseling

Computer Science B.Sc.

Name	Title	Reception	Phone	Email	Location
Prof. Daphna Weinshall	Head of the Program	Sunday 10:00-11:00	54-94542	*	Ross 211
Dr. Amir Globerson	First year advisor	Tue 9:00-11:00 Or via email appointment	54-94537	*	Ross 210
Prof. Sara Cohen	Second & third year advisor	1st semester: Monday 13:00-14:00 2nd semester: Tuesday 13:00-14:00	54-94545	*	Ross 205
Yael Ben-Lulu	Program Coordinator		54-94513	*	Ross 70

Computational Biology B.Sc.

Name	Title	Reception	Phone	Email	Location
Prof. Nir Friedman	Head of the Program	via email appointment	54-94557	*	Silberman
Prof. Linial Michal	Head of the Program	Sun 12:00-13:00	65-85425	*	Silberman 515
Hagit Yaar-On	Program Coordinator		54-94504	*	Ross 70

Computer Science M.Sc.

Name	Title	Reception	Phone	Email	Location

Prof. Yuval Rabani	Computer Science - MSc	Wed 16:00-17:00	54-94562	*	Ross 216
Dr. Shai Shwartz	Computer Science - MSc	Wed 15:30-16:30	54-94565	*	Ross 57
Hagit Yaar-On	Program Coordinator		54-94504	*	Ross 70

Computational Biology M.Sc.

Name	Title	Reception	Phone	Email	Location
Prof. Linial Michal	Head of the Program	Sun 12:00-13:00	65-85425	*	Silberman 515
Hagit Yaar-On	Program Coordinator		54-94504	*	Ross 70

Computer Science Ph.D.

Name	Title	Reception	Phone	Email	Location
Prof. Ari Rappoport	Computer Science - PhD	By appointment	54-94564	*	Ross 23
Hagit Yaar-On	Program Coordinator		54-94504	*	Ross 70

Students with special needs can receive assistance from the university's unit for supporting students with learning disabilities. This unit has nine full-time members and provides students with learning disabilities with a broad range of solutions including diagnosis of disabilities, modifications of exams and general support and companionship.

3.4.6.2 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 direct career assistance; instead we maintain an email list where employees can offer career opportunities to students who choose to opt-in to the mailing list. We also participate in a yearly "job fair" along with the rest of the faculty of science.

3.4.7 What are the mechanisms that deal with student complaints? Please provide a list of students' complaints over the last two years and the way they were resolved.

Most student complaints are handled by the faculty members who head the respective programs. We also have a yearly committee meeting of students and faculty. The protocols from the last two meetings are provided in the attached CD, folder Huji_Extra_1_7_2012.

Here are the actions we took to address some of the major complaints:

2011:

- From 2012, we implemented a few changes in the introduction to computer science mandatory course. Most importantly, the format of the exercises was rethought and overhauled. As of 2012 we provide students with automatic testers, so that they know whether their program works correctly, and if not where it fails. As a result, the students' work style is more focused and efficient, and the learning process is more effective. We received very positive feedback from the students regarding this change.
- Probability course: a grader was given to the course as of 2012.
- Algorithm course – the criticized method of interviews was replaced by weekly quizzes.
- We installed a dedicated "quiet area" in the students computers work space.

2012:

- From 2013, we will offer the introduction to CS course also in the second semester, to decrease the load in the first semester, especially for the engineering students.

- Alex Samorodnitsky will coordinate difficulties of students who are called to military reserve duty during the semester for an extended period of time.
- We arranged for a more balanced distribution of the elective courses between the 2 semesters.
- We opened the students computers work space 24 hours a day, as requested.

3.4.8 What financial assistance is provided to students with financial problems and to outstanding students? What other types of financial support is available to students?

Financial aid to outstanding students is given by the university. This includes the Dean's list for academic achievement (who may get up to 50% of their tuition), the Rector's list for academic achievement (who may get up to 100% of their tuition along with a monetary reward). In both cases, membership on the list depends on the grades. The university also gives excellence awards to incoming students according to their psychometric grades and matriculation grades. Students with financial problems are handled by a special commission in the university which can determine tuition relief (for B.Sc. students) along with student loans (for all students).

3.4.9 Do the institution and/or the department maintain contact with their alumni, employers, and employment market? Please specify the extent of integration of alumni into the labor market (especially relevant when the study program is "professional"): 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). Relevant surveys would be appreciated.

We have only now started to establish contact with our alumni. We have preliminary data that is available in the appended table on the CD, in folder Huji_Alumni_1_7_2012.

3.4.10 In summary, what are the strengths and weakness of the issues specified above?

The main strength emerging from of the issues discussed above are the high quality of our students. We are delighted with the high level of performance of our students and the dedication with which they pursue their studies and (for some of them) research. One of our major weaknesses is the number of people who are admitted into our program but choose to go elsewhere.

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 7.2A through 7.2D (pages 15-17).

The teaching staff consists of 33 Senior Academic Staff members, 37 Senior Adjunct Teaching Staff (8 adjunct lecturers and 28 teaching assistants), and 8 Junior Adjunct Teaching Staff (3 lecturers and 25 graders). Note that there are no Junior Academic Staff members, as the ranks of Lecturer, Senior Lecturer, Associate Professor, and Professor appointments are all considered Senior Academic Staff.

3.5.1.2 How are the faculty members divided into areas of specialty in the discipline and to what extent does the faculty profile allow flexibility within the study program.

The CS faculty members are divided into a diverse set of areas of expertise, with several faculty members belonging to more than one area. The areas of expertise include:

- *Artificial Intelligence*

Daniel Lehmann (Emeritus), Jeff Rosenschein, Aviv Zohar

- *Cluster, GPU And Cloud HPC System*

  Amnon Barak (Emeritus)

- *Computational Biology*

  Nir Friedman, Tommy Kaplan, Nathan Linial, Naftali Tishby, Yair Weiss

- *Computational Economics*

  Daniel Lehmann (Emeritus), Noam Nisan, Michael Rabin (Emeritus), Jeff Rosenschein, Michael Schapira, Aviv Zohar

- *Computational Geometry and Design*

  Michel Bercovier (Emeritus), Leo Joskowicz, Michael Werman

- Computational Neuroscience

  Amir Globerson, Naftali Tishby, Daphna Weinshall, Yair Weiss

- *Computational Photography and Graphics*

  Raanan Fattal, Dani Lischinski, Shmuel Peleg, Mike Werman

- *Computer-Aided Surgery*

  Leo Joskowicz, Dani Lischinski

- *Computer Systems*

  Danny Dolev, Dror Feitelson, David Hay, Scott Kirkpatrick

- *Communication Networks and Distributed Computing*

  Danny Dolev, David Hay, Michael Schapira

- *Computer Vision and Imaging*

  Shmuel Peleg, Amnon Shashua, Daphna Weinshall, Yair Weiss, Mike Werman

- *Databases*

  Sara Cohen, Yehoshua Sagiv

- *Machine Learning*

  Nir Friedman, Amir Globerson, Shai Shalev-Shwartz, Scott Kirkpatrick, Eli Shamir (Emeritus), Naftali Tishby, Yair Weiss, Daphna Weinshall, Amnon Shashua

- *Natural Language Processing & Computational Cognitive Linguistics*

  Ari Rappoport

- *Quantum Computing*

  Dorit Aharonov, Michael Ben-Or

- *Scientific Computing*

  Raanan Fattal

- *Signal Processing & Communication*

  Ami Wiesel

- *Theoretical Computer Science*

  Dorit Aharonov, Yair Bartal, Michael Ben-Or, Orna Kupferman, Nati Linial, Noam Nisan, Yuval Rabani, Michael Rabin (Emeritus), Alex Samorodnitsky,
  Eli Shamir (Emeritus), Guy Kindler

- *Wideband Radio Communications*

  Dana Porrat

- *Information Theory*

  Tishby, Y. Kochman

The study programs are:

- Computer Science
- Computational Biology
- Computer Engineering and opto/microelectronics
- Computer Engineering

The faculty are assigned to courses according to areas of expertise and to the teaching needs of the School. The areas of expertise of faculty members cover most of the course subjects. For those that are not covered, adjunct lecturers are hired on an as-needed basis.

3.5.1.3 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.

All senior staff members are required to have a PhD degree and a proven track record of research and publications in their fields. Teaching assistants are MSc and PhD students, all of whom are required to have a BSc. Teaching assistants involved in frontal teaching are all PhD students, with the exception of 3 outstanding MSc students. Teaching assistants involved in grading are all MSc and PhD students. Adjunct lecturers have an MSc of PhD. They are chosen based on their extensive experience in industry and the knowledge of the areas that they teach.

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

Our Senior and Junior Academic Staff Members are all first-rate active researchers in their fields. They write academic papers, review articles for conferences and journals, actively organize and participate in professional conferences worldwide. They are up to date in the latest developments of their professional fields. This is directly reflected in the courses, seminars, and laboratory projects in which they are involved.

Senior and Junior Adjunct Staff Teaching Assistants are guided by the Academic Staff members and benefit from their knowledge and experience. The Adjunct Lecturers that come from industry continuously update their knowledge of their respective fields from their workplace and professional activities.

3.5.1.5 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? What steps are taken to ensure that the faculty are informed of these policies and procedures? Are you satisfied with these procedures?

The current head of the study program is Prof. D. Weinshall, who is serving her second year.

The appointment is for a two-year period with the possibility of renewing the appointment for an additional 2-year period. The head of the School of Engineering and Computer Science makes the appointment. The appointment is determined by a vote by all the School members following an open nomination process and discussion. The availability of the position as well as the duties and responsibilities are presented to all the School members. Self-nominations are also accepted.

This open and democratic procedure has been in place for at least 20 years. The staff members and previous heads of the study program are satisfied with the procedure and do not see a reason to change it.

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

The head of the study program must be an Associate Professor or a Full Professor. The candidate must be a Senior Academic Staff member familiar with the program and the School. The duties of the head of the study program include defining the academic policy of the courses, revising and updating the syllabus of existing undergraduate and graduate courses, and approving new courses. S/he also heads the Curriculum Committee, where these issues are discussed.

3.5.1.7 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 Academic Staff members are all full-time employees of the University. They are all required to teach at least 6 hours per week per semester. Adjunct Teaching Staff consist of Adjunct Lecturers, Teaching Assistants, and Graders. All Adjunct Lecturers are employed part-time for the specific course they teach. Teaching Assistants and Graders are all employed full time and are required to teach 8.8 hours per week per semester.

3.5.1.8 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?

Senior Academic Staff members are expected to advise final projects and thesis based on the subject area, student load, and interest. Senior Academic Staff members serving as Student Advisors help students find and approach the most appropriate academic staff member. There is no official enforcement mechanism, as there is a consensus that there is no need for such a mechanism. Teaching Assistants and Adjunct Lecturers are required to supervise student projects as part of their employment and course load.

3.5.1.9 What is the policy regarding recruiting and absorbing teaching staff (senior as well as junior) and what are the plans for the <u>future</u> recruitment to the study program? How are these plans made and by whom?

Senior Academic Staff is recruited every year based on a stringent selection process. The head of the Candidates committee receives the candidate applications and puts together a candidate file consisting of the candidate's curriculum vitae, letters of recommendation, and most relevant papers. Subsequently the candidates are brought to a faculty assembly for open discussion, ranking and vote. The top candidates are then identified and passed on to the Area Committee, which makes recommendations to the Dean of the Faculty of Mathematics and Natural Sciences.

The criteria for selection are first and foremost academic excellence, with special attention paid to specific academic areas to be developed. The plans for future development are established by consensus in a open discussion at faculty meetings by all Senior Staff Members.

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?

The administrative staff consists of 13 people divided into 3 groups.

<u>Management team</u>

- Administrative Director: Zohar Marcovich
- Accountant: Relly Krupp
- Human Resources: Silvia Belisha
- Assistant for Academic Affairs: Dikla Soae
- Maintenance: Jacob Yagen
- Hardware Lab Manager: Doron First

The management team is responsible for the day-to-day management of the School of Engineering and Computer Science.

Research Grant Administrators

- Adel Aharon
- Yael Bar David
- Regina Krizhanovsky

The research grant administrators team is responsible for managing the numerous grants of the Senior Academic Staff Members. They coordinate the budgets with the accounting office of the Hebrew University, with the Authority for Research and Development and its various regional desks (America, Europe, Israel), and with Yissum, the Technology Transfer and Intellectual Property company of the Hebrew University of Jerusalem.

Student Affairs Coordinators

- Coordinator, teaching and Students Affairs: Yael Ben-Lulu
- Coordinator, Computer Science Programs: Rina Cohen
- Coordinator, Computational Biology and Advanced Studies: Hagit Yaar-On
- Coordinator, Engineering Programs: Hila Hayo-Danin

The student affairs coordinators manage all the aspects of the students' academic issues, including registration, matriculation, and communication with the Authority for Students.

The Systems Group consists of 10 people:

- Head: Danny Braniss
- Deputy Head: Jorge Najenson
- Team members: Ganel Israel, Tomer Klainer, Tanya Kuzmitski, Ely Levy, Dmitry Perchanov, Ephraim Silbergerg, Chana Slutkin, Yair Yarom.

The systems group is responsible for all the computing infrastructure of the School of Engineering and Computer Science. It is responsible for managing and maintaining the communications network of the School and all its files, network, and personal computers, both hardware and software. The Systems group operates the undergraduate CS student computer clusters, and all computers of the Senior Academic Staff, Teaching and Research Assistants, and Adjunct Teaching Staff. They install and develop software for the academic courses and provide file server and networking capabilities.

In addition, the following positions are held by Senior Academic Staff Members:

- Head of the School: Prof. Jeff Rosenchein
- Head of the Computer Science Program: Prof. Daphna Weinshall
- Head of the Computer Engineering Program: Prof. Alex Samorodnitsky
- Head of the Computational Biology and CS Program: Prof. Nir Freidman
- Head of the Bioengineering Program: Dr. Yaakov Nachmias
- Head of the Computer Engineering/Applied Physics Program: Prof. Uriel Levy

The School Head is responsible for the academic management and coordination within the School. Each Program Head is responsible for his/her respective program.

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

The main strength is the existence of a unique group of highly skilled and committed individuals who work together to achieve a high level of service to the students and staff.

The Senior Academic Staff consists of recognized researchers in their field. The School is ranked the 27th top CS Department worldwide according to the Shanghai academic ranking. The hiring of new members is based on academic and research excellence with an open, consensus-based process. The Adjunct Teaching Staff is hired on an as-needed basis.

The Administrative Team effectively and efficiently manages the many aspects of the School. It is highly structured and well organized, with clear tasks and responsibilities allocated to the team members. The Systems Group provides vital and unique services across a complex and varied set of hardware and software configurations. They ensure that the students and staff have a high-quality, state-of-the-art computing environment.

To this section, please attach the following information:

- **Tables 7.2A through 7.2D (in chapter 6 of this document, pages 15-17) detailing senior and junior teaching faculty employed, external senior and junior teaching staff, teaching and research assistants, post-doctoral staff members.**

See tables 7.2.A through 7.2D in the appendix.

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 Where the unit is physically located in the institution, in which building, and where does the study program under evaluation operate? Do other study programs share the building?

The school of computer science, and its study programs, are scheduled to move to their new Rothberg Building, Givat Ram Campus, on November 2012. This is a brand new building whose gross area is 14,000 meters. 10,000 meters will be occupied initially, and 4,000 meters are kept for future expansion. The description below addresses only the initially occupied area. In addition, the building has an underground parking lot for 175 cars.

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

The building has 106 offices, each having an area of approximately 15 meters. 50 offices serve the senior faculty of the program and visitors. 56 offices serve the junior faculty (PhD students). In addition, numerous research labs serve the MSc students, the area of each lab is approximately 36 meters. All offices and labs have windows that can be opened for fresh air.

A Special computer facilities area houses the technical system group. Another area is devoted to the administrative staff of the program. All offices and labs have multiple power outlets as well as multiple wired network connections of speed 1Gb.

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 is the equipment can in each room /classroom/auditorium (including reference to the possibility of using personal laptop computers on campus).

The Rothberg building includes three classrooms (70 seats) and one auditorium (250 seats). All have modern audiovisual equipment. Each auditorium seat has a power socket.
In addition, 10 smaller meeting/seminar rooms are available, about 15 seats each, whose purpose is to support research groups. 6 additional meeting/seminar rooms are available to undergraduate students in order to encourage group studies and project collaboration.
The entire building is covered with wireless network to allow WiFi connectivity everywhere.

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

When necessary, the program is served by the teaching facilities on the Givat Ram campus which include numerous classrooms and auditoria.

3.6.3 Computerization

Please specify the computer layout, and how it serves the study program. E.g., 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.

The computer facilities area includes a computer center which is supported by superior networking connection, air-condition, and UPS. It includes more than 100 powerful servers that support teaching and research, with centralized file system having automatic snapshots and backups. The undergraduate students have a spacious computer farm with 250 PCs. The WiFi network, and the multiple lounges for students, encourage use of hundreds of laptops and other portable devices in the building.

3.6.4 Laboratories

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

The program has twenty research laboratories. They are mostly used by graduate students working on their research, and by undergraduate students preparing guided projects. Most equipment is based on PCs. One specialized teaching lab is geared for electronics and engineering students, and has specialized electronics equipment.

3.6.5 Library and Information Technology (IT)

3.6.5.1 Describe the library, which serves the students and the teaching staff of the study program: location, physical structure, number of titles according to subjects, journals and e-journals, computerised databases, 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? Specify likewise the policy guiding the purchase of material for the library: who make the decisions with regard to the purchase of books, journals, computerised 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 main library for students, researchers and faculty in computer science and engineering at the Hebrew University is the Mathematics and Computer Science Library. This library provides guidance and the tools for research and teaching in computer science and engineering: research books, textbooks, databases, periodicals and electronic resources.
The Avraham Harman Science Library (the central library of the Faculty of Science) provides additional resources. Both libraries are located at the Edmond J. Safra Campus, Givat Ram.

Mathematics and Computer Science Library
The Mathematics and Computer Science Library started as the mathematics library in 1925, the year when the Hebrew University and the Institute of Mathematics were founded.

The library collection in computer science started in the early 1970's, after which the library became the Mathematics and Computer Science Library. Today, the library is rooted in the organizational structure of the libraries authority and serves the Einstein Institute of Mathematics and the Selim and Rachel Benin School of Engineering and Computer Science.

The library has a good reputation, noted by many visitors from abroad, matching the reputation of both the Einstein Institute of Mathematics and the Selim and Rachel Benin School of Computer Science and Engineering. The combination of Mathematics and Computer Science in the same complex (while maintaining the separation of the fields), contributes significantly to researchers in both fields. It should be noted that the library's collections serve also many students and researchers in other disciplines.

Location:
1928-1948: The library was located in the Philip Wattenburg building on Mount Scopus.
1948-1957: After the war of independence, the institute and its library moved to the north annex of the King David Hotel.
1958-today: The library moved to the Manchester Building, Einstein Institute of Mathematics in the Edmund J. Safra Campus, Givat Ram.

Physical structure:
The present building was built in 1957. It was designed by Heinz Rau and David Reznik. The entrance to the library on the first floor leads to its main reading hall, which is an impressive piece of architecture, with high ceiling and wood panels. In 1995 a new wing was added to the library in the entrance floor of the Manchester House, and was connected by an internal staircase. The architect for these renovations was Zeev Ravina.

The main reading hall contains most of the collection in mathematics, the reserved book collection in computer science, and six computer stations. Three annexed rooms store the rest of the mathematics collection and the computer science collection. The service area is on the same floor with circulation and reference desks, staff work area, displays of new and rare books and journal display area. The periodical collections in Mathematics and Computer Science are stored on the ground floor, along with a photocopy machine, computer printer, four computer stations, desks and a work area for binding.

The emergency exit (service entrance), located on this floor, can be accessed by wheelchairs. A magnifying device for the visually impaired is available. The library's total area is 542 square meter. In addition, the library has an archive (76 square meter) in the basement floor of the Manchester Building, where older periodicals and books in mathematics and computer science are stored.

Number of titles according to subjects:
The library contains about 8,000 titles in computer science and engineering.

The library's collection in computer science is adapted to the research and teaching needs. Its unique, flexible classification system covers the main areas of computer science research. There are hundreds of books in each of these areas of computer science and many more in a variety of related areas. Each book record in the catalogue includes standard LC (Library of Congress) subject headings and classification.

Online books: Library patrons also have full text online access to a vast number of conferences and standards in computer science and engineering, through online subscriptions to the ACM and IEEE xplore digital libraries. The Hebrew University also subscribes to the MIT CogNet collection of electronic book in cognitive and brain science disciplines. Access to online collections is available from any computer on the university's network.

Theses: The collection includes about 200 Ph.D. and 450 M.Sc. dissertations in computer science. For the past several years, most of the dissertations are also available online to the Hebrew University community through the library catalogue.

Books in related subjects: The Harman Science Library's book and periodical collections as well as its electronic resources specialize in life sciences, physics, chemistry, science teaching and applied sciences. Its collections in physics, applied physics and computational biology are related to the research in the Selim and Rachel Benin School of Computer Science and Engineering.

Periodicals and electronic journals:

Over the past few years the trend in libraries around the world (including the Hebrew University) has been to cancel paper subscriptions and to switch to electronic subscriptions. This move is motivated by economic considerations as well as the convenience of library users who prefer electronic journals. In a field where the changes are rapid and where it is important for researchers to have access to information as soon as possible in order to stay at the forefront of research, electronic journals have many advantages. They enable access from any computer on the university's network, and they are updated quickly.

Until 2004, the library had about 170 print subscriptions of periodicals in computer science (a list is available at the library's website). All these subscriptions have been converted to electronic access only. Each electronic subscription (including subscriptions converted from print to electronic) is represented by a card in a display near the entrance to the library, including access information.

Essential to the research in computer science and engineering, are our online subscriptions to the ACM and IEEE xplore digital libraries, which include access to hundreds of important periodicals. Another important source of online periodicals is our subscription to the SIAM ejournals (including the Locus archive).

The print collection of computer science journals is on the ground floor of the library. An archive of older periodicals and books is available in the basement floor. The library staff watches and maintains carefully the completeness and consistency of the periodical and standing order collections and the continuity of electronic access.

In addition the Hebrew University subscribes to electronic journal collections and archives of certain publishers, through other libraries, Hebrew University, or MALMAD subscriptions. These subscriptions extend the scope and variety of electronic journals, beyond the library's subscriptions. Examples: EBSCO, GALE, Elsevier, Springer, Wiley journals and archives.

In professional journals (as with books) there is a considerable overlap of the fields of mathematics and computer sciences, and there are a number of periodicals in the collection which are defined as mathematics but are also in widespread use in computer science. In total, full text access to about 1,500 computer science electronic journals is available through the online catalogue (some of them are also available through the library's website).

Computerized databases
As mentioned before, the library subscribes to the key digital libraries in the field: ACM and IEEE xplore.

Bibliographic databases: The library subscribes to the ACM digital library, which is the main database for locating articles in computer science. It also subscribes to the MathSciNet, which focuses on mathematics, but contains material related to computer science. The Harman Science Library subscribes to the Inspec database, which focuses on physics and engineering, as well as some databases in biology and physics. The Hebrew University also subscribes to some general databases of use to all disciplines: Web of Science, Scopus.

Number of obligatory textbooks relative to the number of students:
The number of textbook copies is flexible and depends on faculty recommendations, the number of students in a class and demand. Generally, the ratio is 1:10 (1 copy per 10 students). At least one copy of each textbook is reserved for study in the library.

Opening hours: Sunday-Thursday, 9 AM – 7 PM.
Number of seats: 80 in the main hall and 20 in the other rooms.

Computer station access and connectivity in the library:
At the Mathematics and Computer Science library, there are 8 computer stations for users, 2 laptops for loan (for use within the library), 2 stations restricted for catalogue search, a network printer and a photocopy machine. Wireless internet connectivity is available in the main reading hall and also some internet and electricity sockets in the library, to enable authorized users with laptops, access to HUJI databases (Unauthorized users have general Internet access).

The Avraham Harman Science Library houses the Berel and Agnes Ginges Information Center. The center incorporates open study areas, smaller study rooms, and a computer classroom. The library has many computer workstations, laptops for loan, printers, a scanner, copy-machines and wireless network access in the entire building.

In addition, access to online resources is available from any of the thousands of computers on the university’s network, including the thousands of computers in computer farms used by undergraduate students.

Using the databases outside the libraries:
Access to databases and electronic journals usually becomes available by recognition of the institution's IP range. Thus, the databases and electronic journals can be accessed from any access point or office in one of the Hebrew University campuses. Students of the Selim and Rachel Benin School of Computer Science and Engineering can access all the library’s online resources in their computer labs. Hebrew University students are provided with a personal username and password to allow them access using public computers. From outside the Hebrew University campus, access is allowed through the VPN service, available to all students and staff of the Hebrew University.

The library's professional staff and their qualifications:

The Mathematics and Computer Science library staff consists of 3¼ regular positions, and ¼ temporary position. These positions are held by four professional librarians (all of whom have a master degree).

The staff high professional level and extensive experience contribute to maintaining the tradition of high standard, quality and professional service, with a personal touch. The librarians perform a variety of tasks, which are adapted to the technological changes. The library also employs 2 students at a total of 100 hours per month.

The library enjoys close cooperation with the academic library committee and other faculty members, and also with the administrative staff of the Selim and Rachel Benin School of Computer Science and Engineering.

Guidance and service in the library:

Quality and personal service is an important goal of the library staff. Opinion polls have shown that the users are very pleased with the attitude, service and assistance in the library (and with the quality of the library's collection). The library staff maintains an informative and comprehensive library website, for additional guidance and resources (as well as a facebook account for contact with users).

Since the 1970's the library has maintained a comprehensive collection of exams. This collection has been scanned and uploaded to the internet, through an online exam database maintained by the Harman Science Library. The library has also cooperated with the Harman Science Library in creating the computer science segment of an online course introducing Hebrew University library resources (databases and online catalogue) to the Faculty of Science and Mathematics students.

The Harman Science library provides Interlibrary loan and photocopy service from Israeli libraries and abroad. The Hebrew University libraries coordinate and cooperate between them to provide quality services to the academic community.

Policy of purchase of books, journals, online resources and databases:

Research in computer science tends to focus on the available online material due to the rapid changes in the field, the importance of updated information and the large amount of available material. Much of this material is provided through online subscriptions, especially conference proceedings (which used to be included in standing orders). As a result of this, much of our computer science budget is allocated for the purchase of the ACM and IEEE xplore digital libraries and the rest for other electronic journals. Interdisciplinary databases are purchased by the institution, usually through a MALMAD consortia agreement.

The library's book acquisition policy focuses on the main teaching and research areas at the Selim and Rachel Benin School of Computer Science and Engineering, while maintaining a basic collection in other fields of computer science. The focus of the book selection is flexible and changes according to changes in the faculty research interests and science itself. The book selection emphasizes quality and state-of-the-art update of the fields.

Books are selected very carefully to assure their quality and relevance, in view of the rapid changes in the field, the increase in quantity and cost of publications, and budget constraints. Availability in other libraries in the Hebrew University and other academic institutions is considered.

Who makes purchase decisions?

Ultimately, the academic library committee makes the decisions about acquisitions of books and journals (including journal cancellations and conversion to e-only subscriptions), in consultation with the individual faculty members in each research field. This process is

coordinated by the library director taking into account the allocated budget and the guidelines of the Hebrew University Library Authority.

Procedures for updating the library:

Book selection information sources:

1. Recommendations of the faculty and research students.
2. Recommendations by students, readers and the library staff.
3. Recommendation from course syllabi and online course information.
4. Review of the catalogs of the main publishers in computer science (printed and online).
5. Reviews from professional journals and databases.

Recommendations can be sent in any way, but the library committee should review and approve it. Additional copies or new editions of textbooks are purchased upon consulting with the course teacher, by demand and class size considerations.

New books are displayed for browsing at the entrance to the library. Their lists (including new electronic journals) are distributed regularly by email to faculty members, research students and anyone else who requests it. The lists are also accessible through the online catalogue. These lists have been filed and kept since the 1970's, so it is possible to follow the development of the collection over the years.

The library's budget in computer science:

In 2003, the Hebrew University established a Library Authority, to coordinate the functions and maintain the budgets of all libraries. The budget is clear and well defined, based on expenditures in the former year. As it happens, the entire computer science budget is committed to continuing the subscriptions of electronic journals, electronic resources and databases. The yearly rise in the price of journals and databases may demand changes in our periodical subscriptions.

The allocated budget usually does not leave any sums for the purchase of research books or textbooks. These books have been purchased, for many years, with the help of the Selim and Rachel Benin School of Computer Science and Engineering. The library also receives a budget for routine technical expenditures and students hours.

Points of strength of the physical infrastructure of library:

The main reading hall, with its special architecture, provides a pleasant, quiet atmosphere for study and research. From its windows, one views the green lawns of the beautiful Edmond J. Safra Campus, Givat Ram. The combination of the fields of computer science and mathematics in a single library (while separating and defining each field) contributes significantly to researchers in the field of computer science, and maintains the historical connection between them. The combined collection also serves the needs of undergraduate students who are required to study compulsory courses in Mathematics.

Points of weakness of the physical structure of library:

1. Lack of storage space: The collections in mathematics and computer science have grown and developed over the years. However, the library did not receive sufficient additional space (or storage) for this growth. Some storage in the Safra campus has been offered recently by the library authority and will be used for print computer science periodicals that have online access.
2. The main entrance to the library is not easily accessible to wheelchairs. Access is possible through the ground floor of the library, to part of the library structure and services.

Additional information about the library is available through the library's website:
http://www.math.huji.ac.il/~library

3.6.5.2 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 Rothberg building and all its offices, laboratories, and classrooms are fully accessible to students with special needs. Access to the library, housed at the historical Manchester building, is not as convenient, as the building has no elevator. This problem is alleviated as most services of the library are now available online, and most textbooks are also available at the Harman library having better access for students with special needs.

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

The Rothberg building is a new and spacious building, and is expected to support the needs of the program and its growth for many years. It has the most modern facilities in both computers and networking, as well as physical systems like air-conditioning and lighting. The program also uses excellent facilities in the Givat Ram Campus like libraries, classrooms, and auditoria.

Diagram of 3rd floor of Rothberg Building. This is the entrance level from the west (top of diagram). Auditorium (left) and cafeteria (center) are marked in blue. The south (left) and central wings will be initially occupied. The shell of the north wing (right) is completed, and is kept for future expansion.

Diagrams of the building, a map of the institution and a list of special equipment and other relevant materials may 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 in accordance with its stated mission. [1]

4.1 What is the department's perception of research, and what are the expected outcomes?

Computer Science is the modern language of Science as computation lies at the heart of understanding all physical and biological systems, and computer science tools are geared to explain all complex system interaction. Following our long tradition of interdisciplinary research our goals are to sharpen those tools, study their capabilities and fundamental limitations, and apply this knowledge, with an eye on long-term global-impact, as widely as possible.

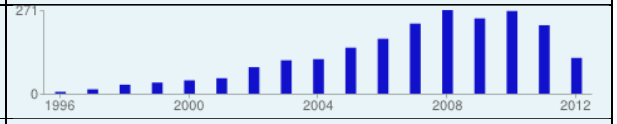
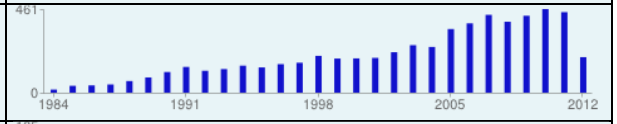
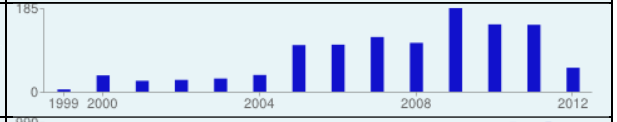
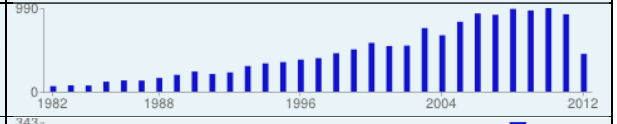
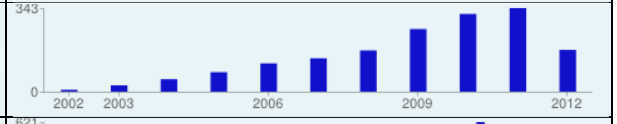
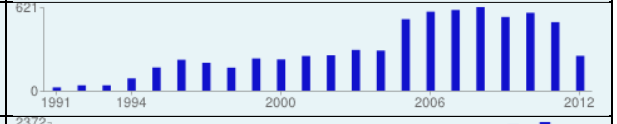
4.2 What are the department's special strengths and uniqueness in research (areas, fields?).

The department has strong research groups in a diverse range of areas, see list in section 3.5.1.2. In many of these areas the group is considered one of the best worldwide. The areas of particular strength, where the group has both outstanding reputation and influence via a significant number of key people, include Theory of Computer Science, Machine Learning, Computer Vision and Imaging, and Economics and Game Theoretic Computation.

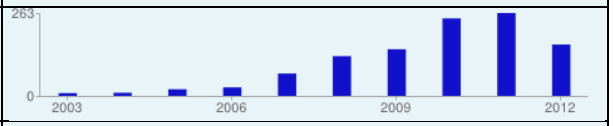
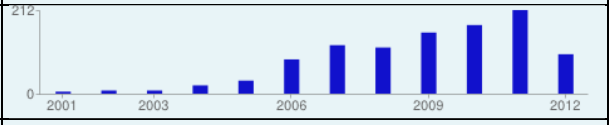
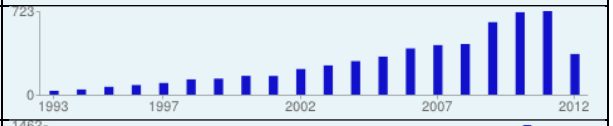
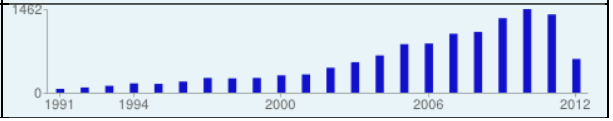
[1] **To this section, please attach the following information (if it does not appear in the section itself):**

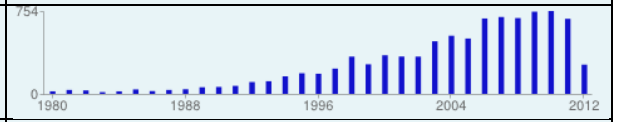
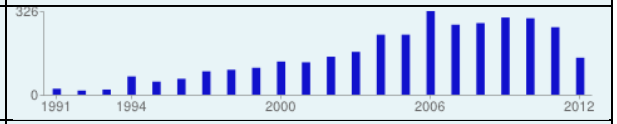
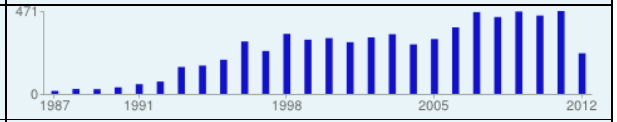
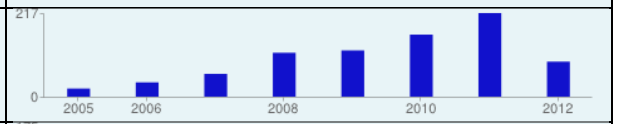
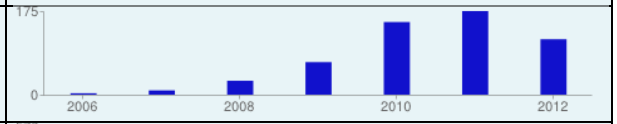
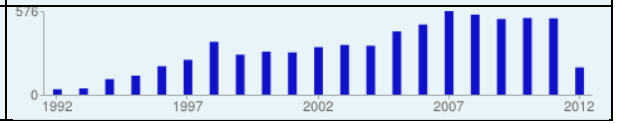
- **A list of names of the staff members (senior and junior) according to research areas, specifying the papers/publications of each staff member within the last five years.**
- **A list of seminars, conferences and workshops held by the parent unit within the last five years.**
- **A list of research grants and other achievements: grants (competitive and non-competitive) obtained by the staff members who teach in the parent unit under evaluation during the last five years.**
- **A list of staff members who have won prizes/scholarships (please specify prizes/journals).**
- **A list of staff members who serve on editorial boards of journals (please specify journals).**
- **A list of chairs, research institutes, research centres and research facilities established in the last five yeas, including specialized laboratories.**

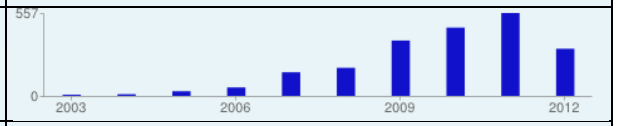
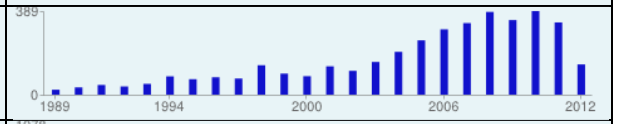
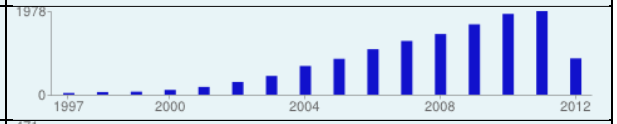
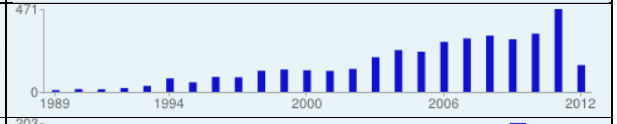
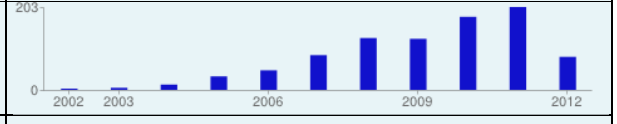
Computer Science Faculty Detailed Research Areas and Citation Record[1]

Name	PhD Year	Research Area	Google Scholar Citations			GS Citation to All Articles
			All	Since 2007	H Index	
Dorit Aharonov	1999 HUJI	Quantum Computation	2199	1353	23	
Yair Bartal	1995 TAU	Algorithmic aspects of computer science, Combinatorial Optimization, Metric Embedding, Data Mining, On-line Algorithms, Network Algorithms	4209		31	
Michael Ben-Or	1982 HUJI	Quantum Computation, Distributed Computation, Fault Tolerance, Computational Complexity, Cryptography	6100	2345	24	
Sara Cohen	2004 HUJI	Databases and the World Wide Web	1150	765	15	
Danny Dolev	1979 WIS	Distributed Computing, Fault Tolerance, Networking, Security	14668	5213	52	
Raanan Fattal	2005 HUJI	Computer Graphics, Computer Vision, Numerical Computing	1702	1403	11	
Dror Feitelson	1991 HUJI	Workload modeling, Parallel Job Scheduling, Software Engineering	6915	3126	42	
Nir Friedman	1997 Stanford	Computational Biology , Systems Biology, Chromatin and Transcription, Epigenetics	20612	12484	62	

[1] Citation graphs and Citations Since 2007 are presented only for faculty that have a personal Google Scholar web page.

Name	PhD Year	Research Area	Google Scholar Citations			GS Citation to All Articles
			All	Since 2007	H Index	
Amir Globerson		Machine Learning, Graphical Models, Optimization, Natural Language Processing	1106	1023	17	
David Hay	2007 Technion	Network Algorithms	891		13	
Leo Joskowicz	1988 NYU	Computer-Integrated Surgery, Computer Aided Mechanical Design and Motion Planning	2449		27	
Tommy Kaplan	2008 HUJI	Computational Biology, Transcriptional regulation, Genomics, and Chromatin	1069	882	13	
Guy Kindler	2003 TAU	Theory of Computer Science	847		14	
Scott Kirkpatrick	1969 Harvard	Complexity and Statistical Physics, Distributed Computing, Future Libraries	39526		46	
Yuval Kochman	2010 TAU	Communication Theory, Information Theory, Statistical Signal Processing	177		7	
Orna Kupferman	1995 Technion	Modeling Specification and Verification of Reactive Systems, Modal and Temporal Logic, Automata on Infinite Objects, Concurrence	5236		38	
Nathan (Nati) Linial	1978 HUJI	Combinatorics, The Theory of Algorithms, Applications of Geometry and Analysis to the above fields, Computational Molecular Biology	7291		41	
Dani Lischinski	1994 Cornell	Computer Graphics, Computational Photography	5805	3294	35	
Noam Nisan	1988 Berkeley	Algorithmic Game Theory, Electronic Auctions	12600	6821	59	

Name	PhD Year	Research Area	Google Scholar Citations			GS Citation to All Articles
			All	Since 2007	H Index	
Shmuel Peleg	1979 Univ. of Maryland	Computer Vision, Computational Photography	9277	3842	48	
Dana Porrat	2002 Stanford	Radio Propagation over Very Wide Bandwidth Stability, Channel Uncertainty	179		7	
Yuval Rabani	1993 TAU	Theory of Computation	3539	1559	33	
Ari Rappoport	1990 HUJI	Computational Applied Linguistics, Geometric and Solid Modeling, Computer Graphics	1886		23	
Jeff Rosenschein	1986 Stanford	Artificial Intelligence, Multiagent Systems	6813	2524	39	
Yehoshua Sagiv	1978 Princeton	Database Systems, Logic Programming, Internet	10358		46	
Alex Samorodnitsky	1998 HUJI	Coding theory, Discrete Optimization, Application of Harmonic Analysis to Computational and Combinatorial Problems, Complexity Theory, Combinatorics	1112		16	
Michael Schapira	2008 HUJI	Networking, Computer Networks, Algorithmic Game Theory	829	762	14	
Gil Segev Joining HUJI Oct. 2013	2010 WIS	Cryptography, Theory of Computer Science, Data Structures, Computing Over Massive Data Sets	560	554	13	
Amnon Shashua	1993 MIT	Computer Vision, Machine Learning	6933	2890	44	

Name	PhD Year	Research Area	Google Scholar Citations			GS Citation to All Articles
			All	Since 2007	H Index	
Shai Shalev-Shwartz	2007 HUJI	Machine Learning, Learning Theory, Online Learning	2192	2067	22	
Naftali Tishby	1985 HUJI	Machine Learning, Computational Neuroscience, Bioinformatics, Biological Computation	8036		35	
Daphna Weinshall	1986 TAU	Computer Vision, Machine Learning, Visual Perception	3978	1934	36	
Yair Weiss	1998 MIT	Machine Learning, Computer Vision, Human Vision	13165	9128	44	
Michael Werman	1987 HUJI	Computer Vision, Geometric Algorithms, Statistical Algorithms	3941	1878	33	
Ami Wiesel	2007 Technion	Statistical Signal Processing, Convex Optimization, Graphical Models, Wireless Communication	914	803	13	
Aviv Zohar Joining HUJI Oct. 2012	2011 HUJI	Artificial Intelligence, Computational Game Theory, Multi Agent Systems, Networks	304		9	

Seminars

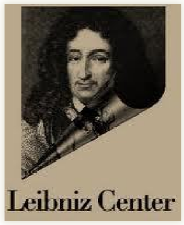
The following ***Research Seminars*** meet more or less regularly on a weekly basis. Research seminars serve as a platform for faculty, post-doc's, guests and graduate students to get updated about current developments in their area.

- The Computer Science Colloquium
- The Computer Science Theory Seminar
- The Computer Vision Seminar
- Quantum Reading Seminar
- The Learning Club
- Computer-Aided Surgery and Medical Image Processing Seminar
- Computer Graphics Seminar
- Distributed Algorithms, Networking and Secure Systems Seminar
- Computational Biology Seminar - BioClub
- Computation and Economics Seminar
- Multiagent Systems Seminar
- Combinatorics Seminar

Research Centers

The following list of research centers exemplifies the deep involvement of our faculty in interdisciplinary research.

Gottfried Wilhelm Leibniz Minerva Center of Computer Science



The goals of the Leibniz Center are to advance basic and applied research in all areas of Computer Science, and to promote dialogue between Germany and Israel in this field. These are met by funding exchange visits of Israeli and German scientists, sponsoring workshops and symposia in research areas that are of interest to the Center's members, granting fellowships to doctoral students at the Hebrew University, and acquisition of specific infrastructure necessary to support the research of members of the Leibniz Center.

Established in 1984, the Leibniz Center has grown in synergy with the School of Computer Science and Engineering. The Center's focus is continually adapted to support innovation and research leadership in selected emerging research topics in Computer Science.
All members of the department are members of the Leibniz Center.
Website: http://leibniz.cs.huji.ac.il/

The Center for the Study of Rationality

Founded in 1991, the Hebrew University's Center for the Study of Rationality is a unique venture in which faculty, students, and guests join forces to explore the rational basis of decision-making. Coming from a broad sweep of departments — mathematics, economics, psychology, biology, education, computer science, philosophy, business, statistics, and law — its members apply game- theoretic tools to examine the processes by which individuals seeking the path of maximum benefit respond to real-world situations where individuals with different goals interact.
CS Faculty Members: Michael Ben-Or, Nathan Linial, Noam Nisan
Other Relevant Faculty: Jeff Rosenschein, Michael Shapira
Website: http://www.ratio.huji.ac.il/

Interdisciplinary Center for Neural Computation (ICNC)

Computational neuroscience is an ambitious research discipline, reflecting a deep conviction among scientists world wide that: (i) The brain enigma is clearly beyond the frame of any one research field. (ii) To fathom the mysteries of the brain, we need to develop a new theoretical framework that will enable us to associate the different levels of brain function - from molecules to neurons to networks to systems and to behavior. (iii) Understanding the multifaceted nature of the functioning brain requires close collaboration across experimental fields - biology, medicine and cognitive psychology, in addition to theoretical concepts and tools derived from physics, computer science and mathematics. Philosophical questions are also fundamental to this endeavor. Founded in 1992, the ICNC is one of the first of such centers; it is renowned the world over for its scientific achievements and its unique Ph.D. program. It is source for pride for its members as well as the Hebrew University.

CS Faculty members: Amir Globerson, Yair Weiss, Daphana Weinshall, and Naftali Tishby.
Website: http://icnc.huji.ac.il/

The Edmond and Lily Safra Center for Brain Sciences

The recently established Edmond and Lily Safra Center for Brain Sciences (ELSC) is building upon Hebrew University's record of excellence and innovation in its multidisciplinary approach to brain science. ELSC researchers focus on several broad areas of inquiry, including genes and neurons, neural networks and plasticity, cognitive neuroscience, computational neuroscience, and sensory and motor functions.

At ELSC, teams of scientists are working together to unravel the causal relationships between genes, brain circuits, cognition and behavior. ELSC provides an intellectual environment where interdisciplinary teams of neuroscientists can take brain research to an entirely new level, advancing scientific understanding of brain function and developing effective new therapeutic – or preventive – approaches to a spectrum of devastating brain disorders.

CS Faculty Members: Leo Joskowicz, Naftali Tishby, Yair Weiss
Other Relevant Faculty: Amir Globerson, Daphna Weinshall
Website: http://elsc.huji.ac.il/

The Center for Quantum Information

Quantum information is a vast research field which touches fields such as Computer Science, Mathematics, Physics, Chemistry and Engineering. Over the last years, the distinct multi-disciplinary aspect of this area has lead to the creation of natural collaborations that cross the boundaries between theses disciplines and renders them obscure. The Hebrew University of Jerusalem has a unique ensemble of fine quantum information researchers. Amongst these are researchers with pioneering world renowned work in their respective fields, as is evident through winning highly competitive grants and prestige awards. This newly established research center is dedicated to quantum information research and for the development and nurturing of collaborations between different disciplines of science involving quantum information.

CS Faculty Members: Dorit Aharonov, Michael Ben-Or
Other Relevant Faculty: Daniel Lehmann
Website: http://qcent.huji.ac.il/

I-CORE: Israeli Center of Research Excellence in Algorithms

The Computer Science departments at the Hebrew University, at the Weizmann Institute, and at Tel-Aviv University were chosen to establish one of the first Israeli Centers of Excellence. The mission of the Center of Excellence in Algorithms is to conduct foundational research in algorithms design, and in many of the related sub-areas. One of the main contributions of the center will be absorbing new brilliant faculty members, who will join its institutions in Israel. In addition, the center will play an important role in training new generations of outstanding graduate students, many of whom will continue to impact the Israeli industry, and will benefit from the research experience they would have gained in the center. The organization of international meetings will be an integral part of the center's activities, and they will strengthen the leading role of the Israeli computer science research.

CS Faculty Members: Aharonov Dorit, Ben-Or Michael, Dolev Danny, Hay David, Linial Nathan, Nisan Noam, Rabani Yuval, Tishby Naftali, Michael Schapira, Weiss Yair
Website: http://www.icore-algo.org.il/

Israel Science Foundation Research Center: Learning and Inference in Real-World Large-Scale Graphical Models

Recent technological advances have made tremendous amounts of data readily available in a wide range of disciplines. In the life sciences, high-throughput technologies have revolutionized molecular biology. On a very different vein, the Internet makes available tremendous large corpora of text and images. A key challenge of applied computer science and machine learning in particular is to develop algorithms that automatically analyze and organize such huge amounts of data. The field of probabilistic graphical models provides a principled framework to model and understand systems with a large number of variables. Graphical models have been successfully applied to a wide range of applications, including image understanding, computational biology and communication engineering. Despite these success stories, the massive size of problems arising from real-world applications often makes it impossible to apply the powerful machinery of graphical models. The goal pf this ISF center of excellence is to develop novel theory and algorithms that will allow us to bridge this gap. In particular, our aim is to develop new inference, learning and model selection algorithms that will enable us to solve large-scale challenging problems in computer vision, computational biology and computational neuroscience. The center has started its operation on October 2011, with a 4 year budget of $1,322,000.

CS Faculty Members: Yair Weiss (PI), Nir Friedman, Amir Globerson, Shai Shalev-Shwartz, and Naftali Tishby.

A New Israel Science Foundation Research Center: Facing the Challenge of Large Unstructured Datasets: Images, Videos and 3D Models

Recent technological advances have made tremendous amounts of visual and geometric data readily available. At the same time, emerging social patterns and a variety of large commercially-driven initiatives have already resulted in huge corpora of images, video, and 3d data on the Internet. Effectively coping with such volumes and diversity of data poses a variety of computational challenges in the fields of image processing, computer vision, and computer graphics. Furthermore, the availability of such data opens a plethora of previously unexplored opportunities for novel applications in these areas. The goal of this research center is to develop both novel low and high-level algorithms for

analyzing and processing large amounts of unstructured visual data, as well as identifying and exploring novel applications enabled by the availability of this data.
During the first year of operation, starting October 2012, the center will be funded by a research grant of $325,000.

CS Principal Investigators: Dani Lischinski, Daphna Weinshall, Michael Werman, Raanan Fattal, Shmuel Peleg, and Amnon Shashua

Intel Collaborative Research Institute for Computational Intelligence

The Intel Collaborative Research Institute for Computational Intelligence will focus on machine learning and heterogeneous computer architecture. Machine learning is critical to transform huge volume of raw data (e.g., spatial and temporal sensory data, online dynamic data, etc.) into computational intelligence. Heterogeneous architecture enables maintaining the required performance within acceptable power and area constraints. The synergetic combination of new machine learning algorithms and computer architecture that make these algorithms practical and efficient lays the foundation for many promising and attractive usages together with the needed hardware and software. The vision for the ICRI-CI is to conduct long-range exploratory research and deliver breakthroughs in architecture, algorithms, and usage models. By bringing together the top minds in the fields of machine learning and computer architecture, and providing the funding and collaborative environment needed to accelerate their research, we hope to create technologies and capabilities for next generation intelligent devices that are efficient, adaptive and always-learning.

Hebrew University Principal Investigator: Naftali Tishby
Other Relevant Faculty: Raanan Fattal, Amir Globerson, Scott Kirkpatrick, Dani Lischinski, Shmuel Peleg, Ari Rappoport, Jeff Rosenschein, Amnon Shashua, Shai Shalev-Shwartz, Daphna Weinshall, Yair Weiss, Michael Werman.
Website: https://www.intel-university-collaboration.net/?page_id=1748

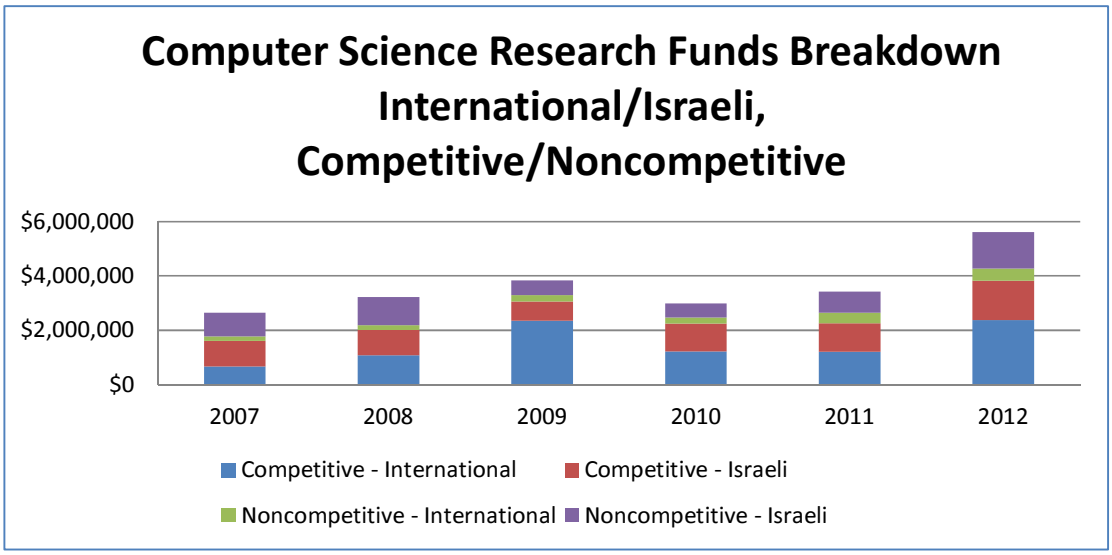
4.3 Please list the leading journals in the field (including ranking, if possible).

The list is too long, and can be obtained from external resources, including the web of science index. For ranking see http://core.edu.au/, or Google Scholar's impact pages.

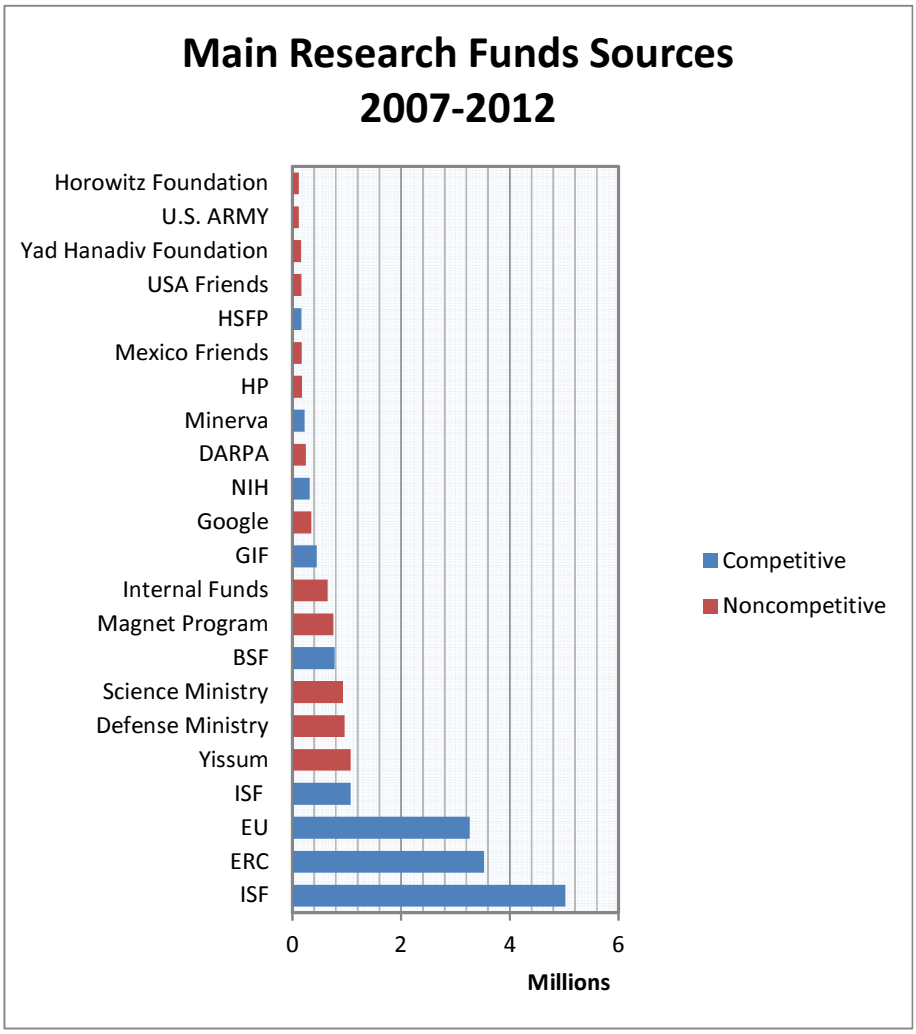
4.4 What are the research funds (in $) of the institution, faculty/school, evaluated unit/study program in each of the last five years according to the source of funding: competitive sources (government/non-government), non-competitive public funds, other non-competitive funds (non-government), internal funds, donations. [1]

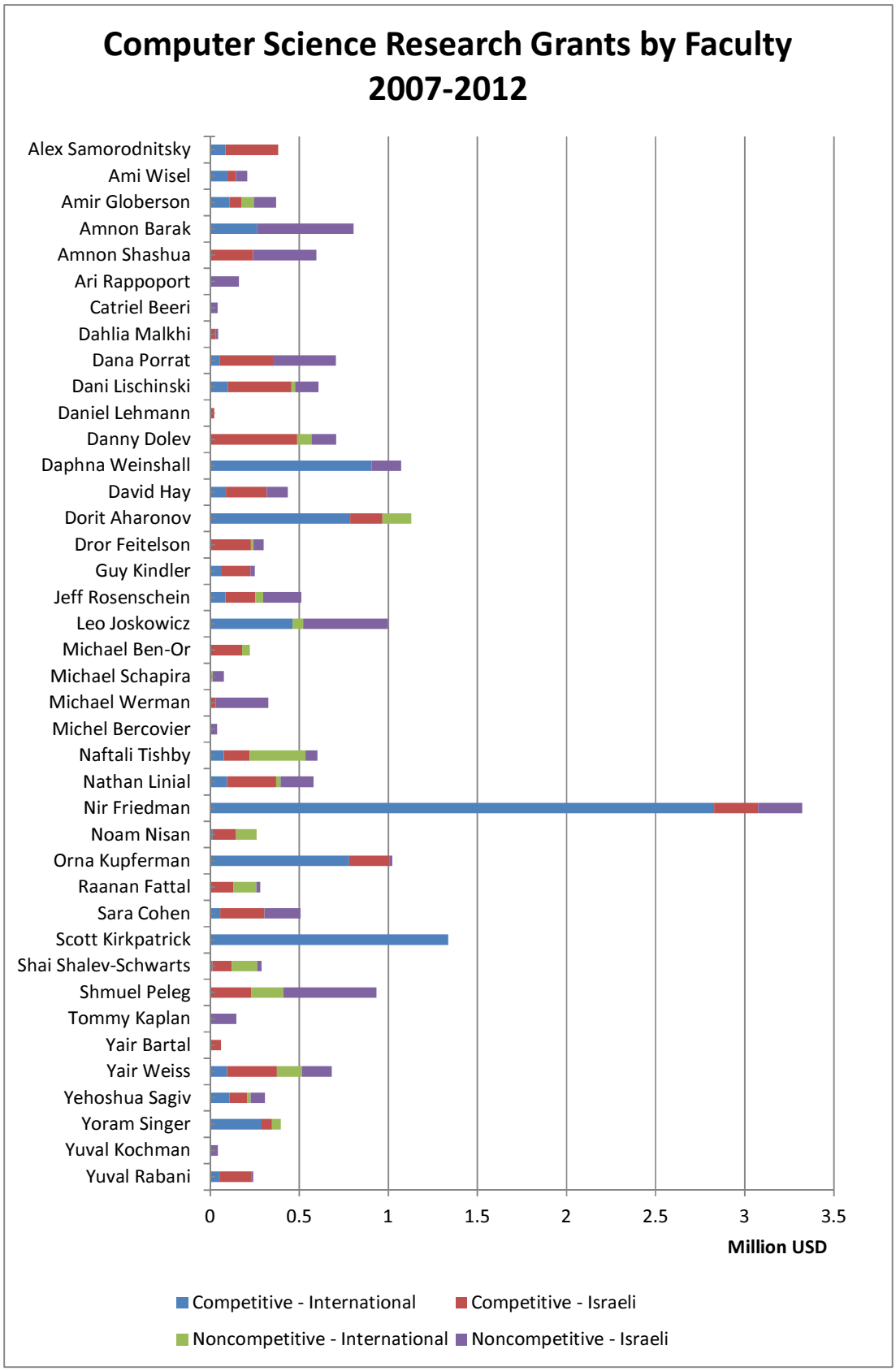
Over the period 2007-2012 the Computer Science department was supported by research funds totalling $21.7 Million. Approximately $15 Million were obtained from competitive sources ($9M International, $6M Israeli), and $6.7 Million came from non-competitive sources ($1.6M International. $5.6M Israeli). For comparison: the total research funds of the Faculty of Science (for the same period) totaled approximately $228 Million.

[1] When converting currencies, please note the exchange rate used.



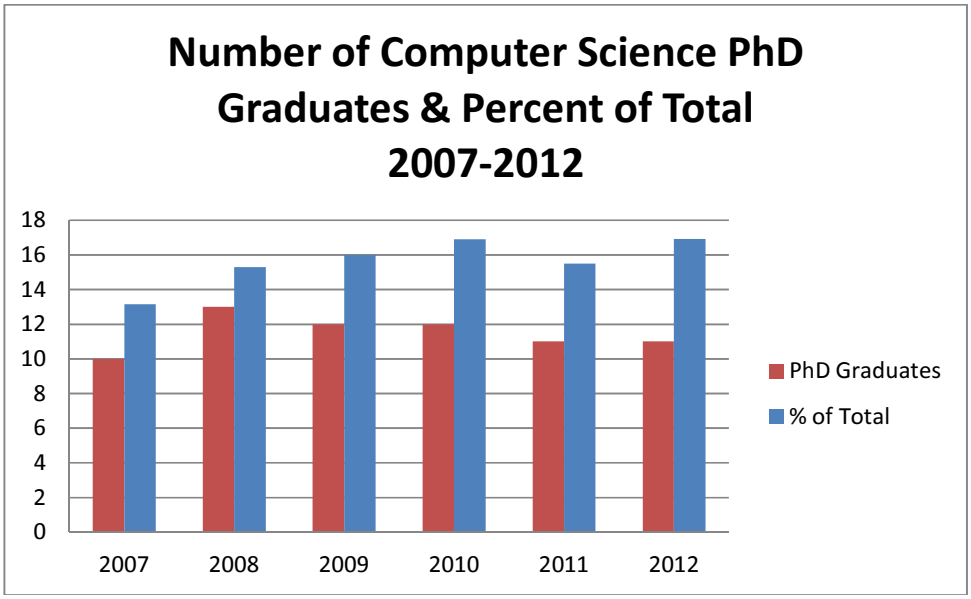
The breakdown according to the main research granting agencies for the period appearing in the table above:

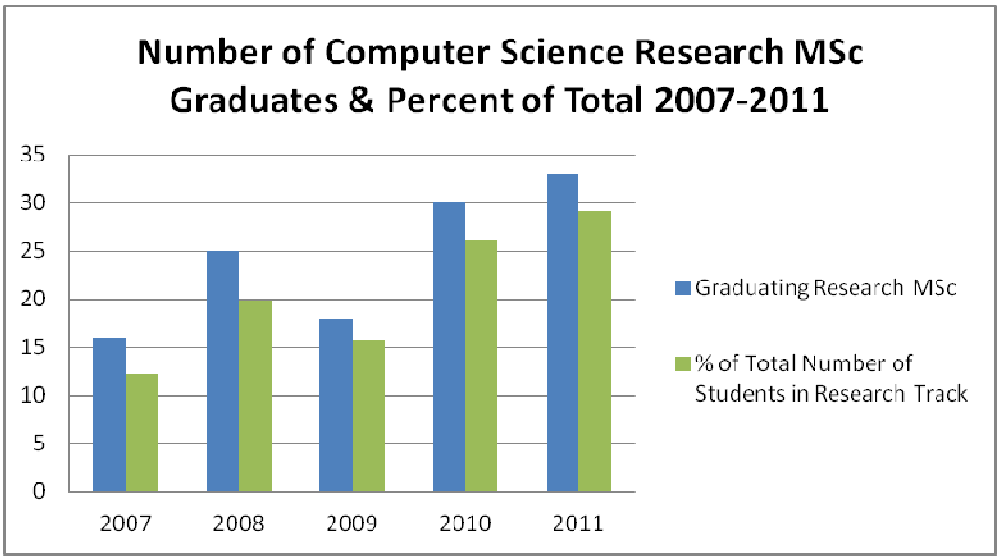



Computer Science Research Grants by Faculty
2007-2012
Alex Samorodnitsky
Ami Wisel
Amir Globerson
Amnon Barak
Amnon Shashua
Ari Rappoport
Catriel Beeri
Dahlia Malkhi
Dana Porrat
Dani Lischinski
Daniel Lehmann
Danny Dolev
Daphna Weinshall
David Hay
Dorit Aharonov
Dror Feitelson
Guy Kindler
Jeff Rosenschein
Leo Joskowicz
Michael Ben-Or
Michael Schapira
Michael Werman
Michel Bercovier
Naftali Tishby
Nathan Linial
Nir Friedman
Noam Nisan
Orna Kupferman
Raanan Fattal
Sara Cohen
Scott Kirkpatrick
Shai Shalev-Schwarts
Shmuel Peleg
Tommy Kaplan
Yair Bartal
Yair Weiss
Yehoshua Sagiv
Yoram Singer
Yuval Kochman
Yuval Rabani
0
0.5
1
1.5
2
2.5
3
3.5
Million USD
Competitive - International
Competitive - Israeli
Noncompetitive - International
Noncompetitive - Israeli

4.5 **Please provide data on research students (master degree with thesis, doctoral degree): overall number (internal/external), sources of funding, level of funding, number of graduates (of the university, faculty/school, parent unit/study program) in each of the last five years.**

Histograms showing the number of PhD and MSc students, where total numbers are listed in Section 3.4.1:





In the 2 histograms above, the units take both roles of absolute numbers (of students) and percent.

Each year the department provides support for about 10 first year M.Sc. students at a level of 170-200% standard M.Sc. fellowship along with a 40% Teaching Assistant position. Each year the department supports altogether about 30 M.Sc. students and about 30 Ph.D. students providing each of them with approximately 40% standard Teaching Assistant positions. The main source, however, for graduate students support are research fellowships funded by the faculty members' research grants.

Listing of Ph.D. graduates from the period 2007-2012 is given in the CD, folder Huji_Alumni_1_7_2012.

4.6 Are faculty members required to serve as advisors of senior projects, theses and dissertations? Are there criteria for assigning advisors to different research projects?

Faculty routinely advise senior projects, students pursuing M.Sc. degree in the research track, and Ph.D. students. Graduate students are encouraged to participate in the department's research seminars where they are exposed to current research. All students are welcome to approach several potential advisers before formally asking the approval of a faculty member to serve as their advisor.

4.7 Please provide a list of publications in the last five years (only by the teaching staff of the evaluated study program) according to refereed journals, books (originals or editions), professional journals, conference proceedings, professional reports, etc.

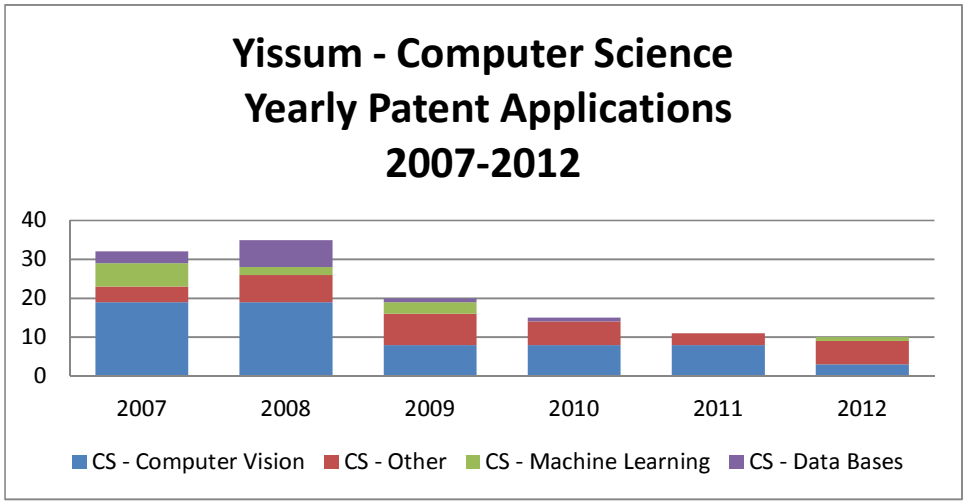
See Faculty's CV in attached CD.

4.8 Is there a commercialization unit in the institution? Briefly describe its function: number of patents registered and where have they been registered.

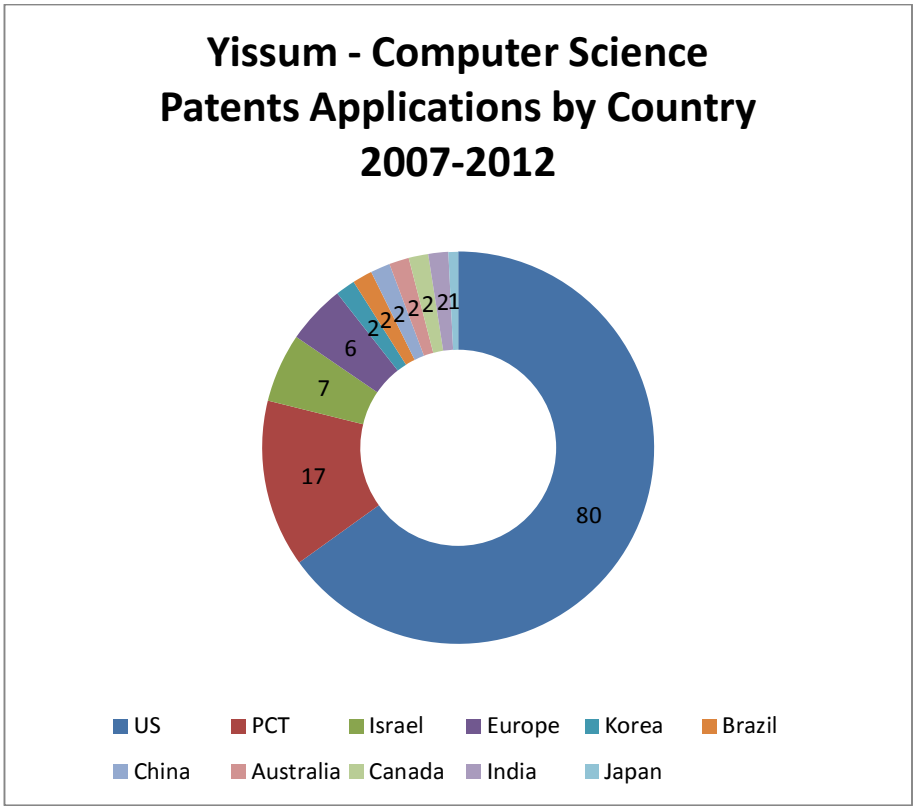
Yissum Research Development Company of the Hebrew University of Jerusalem Ltd. was founded in 1964 to protect and commercialize the Hebrew University's intellectual property. Products based on Hebrew University technologies that have been commercialized by Yissum currently generate $2 Billion in annual sales. Ranked among the top technology transfer companies in the world, Yissum has registered over 7,700 patents covering 2,200 inventions; has licensed out 580 technologies and has spun out 74 companies. Yissum's business partners span the globe and include companies such as Novartis, Microsoft, Johnson & Johnson, Merck, Intel, Teva and many more. For further information please visit Yissum's web site at www.yissum.co.il.

Patents

During the years 2007-2012 Yissum has filed 123 Computer Science patent applications, representing a total of 92 patent families. These patents represent innovation originating from research of Hebrew University faculty and graduate students.



Industrial Transfer via Yissum



During the past decade faculty at the Hebrew University have founded/co-founded the following companies.

BriefCam Ltd.

BriefCam is an early stage start-up company, established to develop and commercialize video synopsis, summarization and indexing technology. The initial technology of video synopsis was developed at The Hebrew University of Jerusalem, and is licensed by BriefCam.

CoolCite Ltd.

CoolCite is a CV based academic portal. It aims to support researchers and allow the sharing of ideas while supporting collaborations with peers. Users can access updated and relevant information for conducting innovative research.

HumanEyes Technologies, Ltd.

HumanEyes introduces software products that enable the simple creation of panoramic 3D stereo images from ordinary photographs captured by any single still or video digital camera.

Mobileye Vision Technologies Ltd.

MobilEye was incorporated for the purpose of developing and marketing advanced products in the surging market of automated on-board driver assistant systems. The company has developed a number of proprietary algorithms and reference platforms that need only a single video camera for ACC, lane departure warning and collision mitigation. Multiple cameras are not needed for depth of scene calculation because MobilEye`s algorithms use an advanced spatio-temporal classification technique based on a novel machine learning approach that trains the system with static and dynamic visual information.

MUSICGENOME INC.

MusicGenome developed a system for identifying musical taste, based on artificial intelligence. The analysis is done by using personal details and a personality questionnaire filled out by customers. The system enables music sites, companies and stores to offer titles suited to their taste.

SENSOTRADE LTD.

Sensotrade Ltd. is a Jerusalem-based company focused on the computational design of trading strategies, that are marketed to financial investment firms. Sensotrade uses its proprietary information analysis algorithms to identify market pricing anomalies (equities that are overpriced or underpriced) and find the strategies to maximize profits when exploiting them.

ReadEasy Ltd.

ReadEasy Ltd. develops a Web-enabled platform that enhances the reading experience of English text by embedding personalized and contextually correct definitions. It offers its solution as pay per use service.

Valensum Ltd.

Valensum is developing innovative technology that provides solution for computer systems' under-performance. The product enables developers and software architects, to build a powerful-distributed application that utilizes the computer's peripherals processors, in an efficient and integrative manner. The company's product provides optimal exploitation of systems' processors, efficient data flow and opening bottle necks in real time.

4.9 Please describe the research infrastructure: research laboratories, specialized equipment, budget for maintenance (level and sources of funding).

We are blessed with an excellent and dedicated system group. These technical staff members of our department, led by Daniel Braniss, are always eager to help with any task or challenge. This group provides support for the computation and communication infrastructure of the computer science department. Altogether they command several thousand CPU cores (along with dozens of GPU's) and file servers that provide the main computing engine for the various research groups of the department. Most CPU cores are connected via a MOSIX grid so that unused computing power can always serve others on the grid.

Other specialized labs include:

- Danna Porrat's Wideband Radio Communications Laboratory
- Leo Joskowicz's Computer Aided Surgery and Medical Image Processing Laboratory

- Nir Freidman's Experimental Wet Lab at the Life Sciences building including a fully automated robotic facility for high-throughput yeast phenotyping.

4.10 Please list grants, honors, fellowships/scholarships, etc received by faculty (senior and junior).

The full list is given in the CD, folder Huji_Extra_1_7_2012. It is summarized above in a compact histogram in Section 4.4.

4.11 Please list cooperation activities by department members both in Israel and abroad.

Without exception, all of our faculty members maintain strong professional ties with colleagues in Israel and abroad. We travel to meetings, schools and conferences and lecture on our work. We meet with co-authors to work on joint projects. International collaboration is essential to the success of our research. In particular during the period 2007-12 our faculty have secured, 19 USA-Israel Binational Science Foundation (BSF) grants, 6 German-Israeli Foundation for Scientific Research and Development (GIF) grants, 15 European Union (EU) grants. All these represent active research collaboration with colleagues abroad.

For further information about research collaborations please refer to the list of research centers involving Computer Science faculty.

4.12 Please list the major consulting activities done by faculty.
4.13 What is the level of synergy between research strengths and teaching needs at the various degree levels?

The basic undergraduate courses, given at a high level, rigor and depth, prepare our students quite well for advanced studies. Advanced courses and seminars are offered by the faculty in their research area as part of the standard teaching load. Research seminars present recent research results to students and faculty. Our successful undergraduate program in Computational Biology, replacing the impossible to accomplish double major in Life Sciences and Computer Science, was among the first of its kind, and following our lead similar programs have sprung up around the world. Other interdisciplinary graduate programs, offered by the Interdisciplinary Center for Neural Computation and by the Center for the Study of Rationality, present via their graduate courses other unique training opportunities for our students.

4.14 In summary, what are the points of strength and weakness of the research, and are you satisfied with the research outcomes of your department?

Research is very strong in the computer science department, with a number of outstanding groups and individuals who are world renowned leaders in their respective fields. The main weakness is the absence of some areas where we lack the expertise and therefore the ability to conduct high quality research.

We are never satisfied as we always strive to improve. Large and strong research groups should work to keep their lead and diversify to excel in further aspects of their field. Smaller groups should grow and increase their impact.

Chapter 5

The Self-Evaluation Process, Summary and Conclusions

5.1. Please describe the way that the current Self-Evaluation process was conducted, including methods used by the parent unit and the department/study programs in its self-evaluation process, direct and indirect participants in the process etc. What are your conclusions regarding the process and its results?

In order to conduct the self evaluation, we have put together a committee, composed of most of the senior faculty members in the school (see list of authors on first page), to do the relevant research and write the self evaluation report. Each member of the committee took charge of collecting the data and writing a specific part of the report, aided by the administrators listed above, who provided the data, some analysis and office support. Data about the institute and the parent unit was provided by the respective administrative units.

5.2. Describe the consolidation process of the Self-Evaluation Report, including its preparation and final approval (including a description of the contributions of staff members to the process).

The head of the study program compiled a first draft of the evaluation report by merging the various parts written by the committee members, and unifying of the report. Subsequently the document was distributed to all the faculty members, including members of the committee, and a second stage of auditing and revision was conducted, supervised once more by the head of the study program. In this second step all the faculty members became aware of the content of the report, the data and the conclusions.

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

The weaknesses, while being revealed in the process of writing the report, have been acknowledged and brought to the attention of all the faculty members of the school. The curriculum committee will carry most of the burden of addressing the weaknesses found in the study program. We intend to deal with future evaluation processes in a similar way to the way it was done this year.

5.4. Is the full Self-Evaluation Report accessible? If 'yes' - to whom it is accessible and to what extent?

The report is accessible to all faculty members of the school.

Chapter 6

Implementation of previous QA recommendations

If the evaluated department/study programs have been reviewed in the past by a CHE evaluation committee, please describe the main changes that were made as a result of the recommendations, such as strategic planning, mission and goals, curriculum, faculty, student body etc.

In this chapter we specify how the school has applied the recommendations of the committee who evaluated us on 2006.

The comments of the committee and its recommendations include the following points:

1. Dissatisfaction from the way the self-evaluation was done in the school.

As specified in our response to the previous report, we are used to self-evaluate ourselves regularly. Indeed, during the six years since the evaluation took place, we conducted quite a few discussions about the school's vision and development plans, following which we conducted several changes in the study programs and our recruitment policy. In addition, for this current report, we did our best to make a better job, as specified in Chapter 5.

2. A recommendation to pay attention to the development plans of the school from the Engineering point of view.

Engineering is of great importance to us. We invested a lot of thinking and effort in the development plans on the engineering front. The last years have been very positive in this respect: the school recruited excellent researchers in areas on the border of engineering and computer science (networks: Michael Shapira and David Hay), engineering areas that are in symbiosis with computer science (signal processing and information theory: Ami Wiesel and Yuval Kochman), applied physics (Uriel Levi, Yossi Paltiel, and Gilad Marcus), and bio-engineering (Yaakov Nachmias). Beyond researchers, the school invests in infrastructure needed for the development in engineering (see Section 3.6), and we constantly improve the study programs in engineering. In particular, more than a year ago we submitted to the CHE a request to open an MSc program in engineering.

3. Dissatisfaction from the high average grade in undergraduate and graduate courses.

Following the report and internal discussions, the teaching committee of the school decided to fix a policy for grading courses. As a rule, the expectation is to achieve an average grade of 85 in the mandatory undergraduate courses. As can be seen in the histograms in Section 3.3.4.3.1, the move led to some small decrease in the averages. Let us note that in the last year we managed, to our great satisfaction, to increase the acceptance threshold to some study programs in the school; this move somewhat dumped our efforts to decrease the grades average.

4. Dissatisfaction from the size of the tutoring groups and the feedback to the students.

This, indeed bothering, situation is a direct outcome of the school's budget. As can be seen in the tables below, the school invests many resources in order to improve the situation, in both issues. Beyond the number of TAs and graders, we put emphasis on their training: the unit for improving the teaching of the Hebrew University arranges a workshop for the TAs each year and mentors TA and faculty that either need or ask for help.

Academic year 2012

	Course	total no. of students	no. of ex groups	student per group
1st year	**DATA STRUCTURES**	308	8	38.5
	INTRODUCTION TO OBJECT ORIENTED	304	4	76
	INTRODUCTION TO COMPUTER SCIENCE	338	8	42.25
2nd year	**DIGITAL COMPUTERS ARCHTECTURE**	214	4	53.5
	COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXITY	245	4	61.25
	OPERATING SYSTEMS	201	4	50.25
	PROGRAMMING WORKSHOP IN C	73	3	24.33
	PROGRAMMING WORKSHOP IN C++	78	3	26
	ALGORITHMS	252	6	42
	DATABASES	160	3	53.33
			Ave	**46.74**

Academic year 2011

	Course	total no. of students	no. of ex groups	student per group
1st year	**DATA STRUCTURES**	308	8	38.5
	INTRODUCTION TO OBJECT ORIENTED	301	4	75.25
	INTRODUCTION TO COMPUTER SCIENCE	340	8	42.5
2nd year	**DIGITAL COMPUTERS ARCHTECTURE**	236	4	59
	COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXITY	230	4	57.5
	OPERATING SYSTEMS	171	4	42.75
	PROGRAMMING WORKSHOP IN C	106	3	35.33
	PROGRAMMING WORKSHOP IN C++	120	3	40
	ALGORITHMS	287	6	47.83
	DATABASES	180	3	60
			Ave	**59.87**

Academic year 2010

	Course	total no. of students	no. of ex groups	student per group
1st year	**DATA STRUCTURES**	346	8	43.25
	INTRODUCTION TO OBJECT ORIENTED	350	4	87.5
	INTRODUCTION TO COMPUTER SCIENCE	344	8	43
2nd year	**DIGITAL COMPUTERS ARCHTECTURE**	228	4	57
	COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXITY	245	4	61.25
	OPERATING SYSTEMS	188	4	47
	PROGRAMMING WORKSHOP IN C	130	3	43.33
	PROGRAMMING WORKSHOP IN C++	141	4	35.25
	ALGORITHMS	280	5	56
	DATABASES	202	3	67.33
			Ave	**54.09**

5. Dissatisfaction from the time it takes to grade exams.

In recent years there is a new policy in the Faculty of Science according to which grades should be posted at most two weeks after the exam. In fact this last spring the policy has tightened even more – down to ten days. The school's teachers respect this policy.

6. A recommendation to reduce student cheating in homework assignments

In the last couple of years we have been working intensively with the university authorities, and in particular with the university disciplinary committee, in order to take measures against students suspected of cheating in homework assignments. Whenever this problem occurs, and when the suspicion is recurring (more than one exercise, or a large project), the teacher files a complaint against the suspected student(s). Subsequently a legal disciplinary action is taken against the student, and a hearing is held. If the student is found guilty, the punishment may include a year suspension, participation in civil service duties, etc.

In the last year, for example, we have filed disciplinary complaints against 8 students in the elective course *workshop from Nand to Tetris*. Most of these students have signed a plea bargain, and received a punishment that included (in some cases) suspension of the awarded degree. A similar complaint against 2 other students, which is still being deliberated, has been filed by the teacher of the *graphics* course.

7. Dissatisfaction from the load and the subjects taught in the Infinitesimal Mathematics course.

Starting in 2008, the math department has been offering a new Infi course ("Infi for Engineers") that serves our Engineering students, as well as students in interdisciplinary programs, and in particular students in the Computational Biology program. These students can replace the Infi 1+2 courses by the courses "math for physics students 1" + "Infi for Engineering".

8. A recommendation to encourage excellence within MSc students.

In addition to an upgrade to the MSc program, we started two years ago with two initiatives: a seminar for excellent students in their last undergraduate year (only the top 15-20 students are invited to the seminar, during which they hear form faculty members about their research) and excellence fellowships to top MSc students. These acts turn out to be fruitful: we managed to increase the acceptance threshold to the MSc program. In particular, during the years 2009, 2010 and 2011 joined the MSc program 40, 45 and 59 students, respectively, with an average BSc grade above 85.

9. A recommendation to encourage joint appointment of faculty members.

Two faculty members in the school (Nir Friedman and Yaacov Nachmias) moved in the last years to a joint position with the Life Science Institute. Additional researchers from the school are members of interdisciplinary centers in the university: Naftali Tishby, Yair Weiss, Amir Globerson, Noam Nisan, Daphna Weinshall (members in the Brain, ICNC or the Rationality centers). In addition, faculty members from other departments have on-going activity in the school, including joint teaching and supervision (Gal Elidan from Statistics, Michal Feldman from Business Management, and quite many faculty members from the math department).

10. A recommendation to improve the teaching level.

As mentioned above the Hebrew University founded a unit for the improvement of teaching, and we are grateful for its help. In addition to annual workshops for all the TAs, faculty members that receive law teaching evaluations are requested to participate in a workshop for improved teaching.

11. A recommendation to follow up our alumni and their integration in the industry.

We are in touch with most of our alumni. Some of them continue to graduate studies and some excel in the High-Tech industry. A partial list can be found in the appended table on the CD, in folder Huji_Alumni_1_7_2012. In addition, we are working on improving the connection with our alumni, see
http://www.alum.cs.huji.ac.il/about
http://alumni.huji.ac.il/

Chapter 7 – Appendices

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

7.1 - The Study Program - Table no. 1

Academic Year of Evaluation - (2011-12)

Remove duplication of courses in the list below, using an option of year 2-3

Framework of study: **single track**/ double track/ other Computer Science – BSc

Year in Program	Semester	Course Title	Course Type (oblig./elective/ seminar/other)	No. of Credits	Prerequisites for Admission	Weekly Teaching Hours	Weekly Exercise Hours	Weekly Laboratory Hours	No. of Students	Teaching Staff	
										Name of staff member	Employment Degree
1	1	INTRODUCTION TO COMPUTER SCIENCE	Obligatory	7		4	2	1	336	Danny Lischinski Noam Nisan	Prof. Prof.
	1	INFORMATION & LIBRARY RESOURCES FOR COMPUTER SCI	Obligatory	0		0	0	0	170		
	1	INFINITESIMAL CALCULUS (1)	Obligatory	7		5	2	0	260	Itamar Zvik (Math. Dept.) Yoram Last (Math. Dept.)	 Prof.
	1	LINEAR ALGEBRA (1)	Obligatory	6		5	2	0	290	Ilya Rips (Math. Dept.) Evgeny Strachov	Prof. Prof.
	1	DISCRETE MATHEMATICS	Obligatory	4		3	1	0	286	Ehud Friedgut (Math. Dept.) Menachem Magidor (Math. Dept.)	Prof. Prof.

	2	DATA STRUCTURES	Obligatory	3	Introduction to computer Science	2	1	0	271	Alex Samorodnitsky	Prof.
	2	LINEAR ALGEBRA (2)	Obligatory	6	Linear Algebra (1)	5	2	0	311	Zlil Sela (Math. Dept.)	Prof.
	2	INTRODUCTION TO OBJECT ORIENTED	Obligatory	4		2		2	279	Roy Schwartz	Teaching assistant
	2	INFINITESIMAL CALCULUS (2)	Obligatory	7	Infinitesimal Calculus (1)	5	2	0	280	Noam Berger (Math. Dept.) Dan Mangoubi (Math. Dept.)	Prof. Dr.
2	1	INTRODUCTION TO PROBABILITY AND STAT FOR CS	Obligatory	5	Infinitesimal Calculus (1) Linear Algebra (1) Infinitesimal Calculus (2) Discrete Mathematics	4	1	0	161	Gal Elidan Pavel Chignaski	Dr. Dr.
	1	PROGRAMMING WORKSHOP IN C	Obligatory	2*	Data Structures	3	1	0	71	Gilad Freedman	Ph.D
	1	PROGRAMMING WORKSHOP IN C++	Obligatory	2*	Programming workshop in C	3	1	0	77	Gilad Freedman	Ph.D
	1	ALGORITHMS	Obligatory	5	Data Structures Introduction to Probability Stat. for CS Linear Algebra (2)	3	2	0	250	Yuval Rabani	Prof.
	1	DATABASES	Obligatory	5	Data Structures	3	1	1	159	Yehoshua Sagiv Sara Cohen	Prof. Prof.
	1	MATHEMATICAL LOGIC	Obligatory	4	Linear Algebra (1)	3	1	0	144	Eliyahu Rips (Math. Dept.)	Prof.

	1	INTRODUCTION TO MACHINE LEARNING**	Elective	5	Algorithms Data Structures Introduction to Probability Stat. for CS	3	2	0	70	Shai Shwartz	Dr.
	1	DIGITAL NETWORK IN MODERN TIME**	Elective	4	Algorithms	2	2	0	93	David Hay	Dr.
	1	INTRODUCTION TO ARTIFICIAL INTELLIGENCE**	Elective	4		2	2	0	78	Jeff Rosenschein	Prof.
	1	COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS**	Elective	5		3	0	3	154	Uri Heinemann	Ph.D
	1	INTERNET TECHNOLOGIES***	Elective	3		3	0	0	120	Ohad Assulin	M.Sc
	1	COMPUTER GRAPHICS***	Elective	4	Programming workshop in C++	2	2	0	33	Raanan Fattal	Dr.
	1	IMAGE PROCESSING***	Elective	4		2	2	0	73	Shmuel Peleg	Prof.
	1	COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS***	Elective	5		3	0	3	154	Uri Heinemann	Ph.D
	1	INTRODUCTION TO INFORMATION AND LEARNING PROCESS***	Elective	4		2	2	0	12	Amir Globerson	Dr.
	1	GAME THEORY (1)***	Elective	3	Infinitesimal Calculus (1) Linear Algebra (1)	2	1	0	53	Abraham Neyman	Prof.

	2	DIGITAL COMPUTERS ARCHTECTURE	Obligatory	4	Introduction to computer Science	2	2	0	207	Ohad Falik	M.Sc
	2	COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXI	Obligatory	5	Algorithms	3	2	0	219	Guy Kindelr	Dr.
	2	OPERATING SYSTEMS	Obligatory	4	Programming workshop in C	2	2	0	204	Dan Dolev	Prof.
	2	INTRODUCTION TO NUMERICAL COMPUTING**	Elective	3	Linear Algebra (1) Infinitesimal Calculus (2)	3	0	0	18	Raanan Fattal	Dr.
	2	INTRODUCTION TO PROBABILITY AND STAT FOR CS B***	Elective	3	Introduction to Probability Stat. for CS	2	1	0	11	Yaacov Ritov	Prof.
	2	INTRODUCTION TO LINEAR SYSTEMS***	Elective	5		3	2	0	49	Naftali Tishbi	Prof.
	2	COMPUTATIONAL PHOTOGRAPHY***	Elective	3	Image Processing	2	2 Every 2 weeks	0	23	Michael Werman Dani Lischinski Shmuel Peleg	Prof. Prof. Prof.
	2	DATA ON THE WEB***	Elective	3	Databases	3	0	0	67	Sara Cohen	Prof.
	2	MATHEMATICAL LOGIC (2)***	Elective	3	Mathematical Logic	2	1	0	25	Ehud Hrushovski (Math. Dept.)	Prof.
	2	GAME THEORY (2)***	Elective	3	Game Theory (1)	2	1	0	16	Abraham Neyman (Math. Dept.)	Prof.

3	1	INTRODUCTION TO MACHINE LEARNING**	Elective	5	Algorithms Data Structures Introduction to Probability Stat. for CS	3	2	0	70	Shai Shwartz	Dr.
	1	DIGITAL NETWORK IN MODERN TIME**	Elective	4	Algorithms	2	2	0	93	David Hay	Dr.
	1	INTRODUCTION TO ARTIFICIAL INTELLIGENCE**	Elective	4		2	2	0	78	Jeff Rosenschein	Prof.
	1	COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS**	Elective	5		3	0	3	154	Uri Heinemann	Ph.D
	1	TEXT MINING FOR BUSINESS APPLICATIONS***	Elective	3		3	0	0	17	Ronen Feldman (School of Buisnes administration)	Prof.
	1	HI-TECH ENTREPRENEURSHIP (1)***	Elective	2		2	0	0	42	Ari Rappoport	Prof.
	1	DISTRIBUTED ALGORITHMS***	Elective	3	Algorithms	3	0	0	21	Dan Dolev	Prof.
	1	TUTORIAL WORK***	Elective	2					0	Chosen by student	
	1	TUTORIAL WORK***	Elective	4					0	Chosen by student	
	1	TUTORIAL WORK***	Elective	6					0	Chosen by student	
	1	COMPUTER AIDED GEOMETRY DESIGN AND MODELING***	Elective	3	Computer Graphics OR Introduction to Numerical Computing	2	1	0	2	Michel Bercovier	Prof.

	1	CRYPTO-GRAPHY***	Elective	3		3	0	0	5	Michael Ben-Or	Prof.
	1	ADVANCED TOPICS IN COMMUNICATION NETWORKS***	Elective	2		2	0	0	21	David Hay	Dr.
	1	INTERNET TECHNOLOGIES***	Elective	3		3	0	0	120	Ohad Assulin	M.Sc
	1	INTRO TO DIGITAL SIGNAL PROCESSING***	Elective	4	Introduction to Linear Systems	2	2	0	67	Yair Weiss	Prof.
	1	INTRODUCTION TO MACHINE LEARNING**	Elective	5	Algorithms Data Structures Introduction to Probability Stat. for CS	3	2	0	70	Shai Shwartz	Dr.
	1	STATISTICAL SIGNAL PROCESSING***	Elective	3		3	0	0	5	Ami Wiesel	Dr.
	1	DIGITAL NETWORK IN MODERN TIME***	Elective	4	Algorithms	2	2	0	93	David Hay	Dr.
	1	INTRODUCTION TO QUANTUM COMPUTATION***	Elective	4	Algorithms	3	1	0	10	Michael Ben-Or	Prof.
	1	COMPUTATIONAL GEOMETRY***	Elective	3	Data Structures	2	1	0	12	Leo Joskowicz	Prof.
	1	HIGH-PERFORMANCE COMPUTING ON GPUS***	Elective	4		2	0	2	17	Amnon Barak	Prof.

	1	COMPUTER GRAPHICS***	Elective	4	Programming workshop in C++	2	2	0	33	Raanan Fattal	Dr.
	1	STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE***	Elective	2		2	0	0	1	Guy Kindelr	Dr.
	1	VISUALAIZATION AND SONIFICATION ZATION AND SONIFICATION***	Elective	3		2	1	0	9	Michael Fink Amir Globerson	Dr. Dr.
	1	PROBABILISTIC METHODS IN ARTIFICAL INTELLIGENCE***	Elective	4	Introduction to Probability Stat. for CS	2	2	0	21	Amir Globerson Gal Elidan	Dr. Dr.
	1	THE PROBABILISTIC METHOD***	Elective	3		3	0	0	24	Alex Samorodnitsky	Prof.
	1	IMAGE PROCESSING***	Elective	4		2	2	0	73	Shmuel Peleg	Prof.
	1	INTRODUCTION TO ARTIFICIAL INTELLIGENCE**	Elective	4		2	2	0	78	Jeff Rosenschein	Prof.
	1	INTRODUCTION TO THEORETICAL COMPUTER SCIENCE***	Elective	3		3	0	0	18	Guy Kindelr	Dr.
	1	FORMAL VERIFICATION OF REACTIVE SYSTEMS***	Elective	2		2	0	0	17	Orna Kupferman	Prof.

	1	COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS***	Elective	5		3	0	3	154	Uri Heinemann	Ph.D
	1	INTRODUCTION TO SOFTWARE AND SYSTEMS SECURITY***	Elective	5		4	0	1	17	Yaron Inger Ohad Fried	M.Sc M.Sc
	1	THEORY OF NEURAL NETWORKS 2***	Elective	4	Theory of Neural Networks 1	3	1	0	11	Haim Sompolinsky	Prof.
	1	INTRODUCTION TO INFORMATION AND LEARNING PROCESS***	Elective	4		2	2	0	12	Amir Globerson	Dr.
	1	DYNAMIC SYSTEMS AND CONTROL***	Elective	3		2	1	0	24	Naftali Tishbi	Prof.
	1	EQUATIONS OF MATHEMATICAL PHYSICS***	Elective	6	Mechanics and Special Relativity OR Electricity and Magnetism	4	2	0	118	Baruch Meirson (Math Dept.)	Prof.
	1	LINEAR GEOMETRY***	Elective	3	Linear Algebra (2)	3	0	0	12	Itamar Cwik	M.Sc
	1	GAME THEORY (1)***	Elective	3	Infinitesimal Calculus (2) Linear Algebra (2)	2	1	0	53	Abraham Neyman (Math. Dept.)	Prof.

	1	NUMBER THEORY***	Elective	2		2	0	0	6	Michael Temkin (Math. Dept.)	Prof.
	1	MODEL THEORY (1)***	Elective	2	Logic of Mathematical Structures Set Theory	2	0	0	7	Saharon Shelah (Math. Dept.)	Prof.
	1	HOMOMORPHISMS OF GRAPHS***	Elective	2		2	0	0	15	Micha A. Perles (Math. Dept.)	Prof.
	1	TOPICS IN CLASSICAL MECANICS***	Elective	3		3	0	0	11	Matania Ben-Artzi (Math. Dept.)	Prof.
	1	HARMONIC ANALYSIS***	Elective	2		2	0	0	9	Matania Ben-Artzi (Math. Dept.)	Prof.
	1	CODING THEORY***	Elective	2	Algebraic Structures (1) Algebraic Structures (2)	2	0	0	4	Alex Lubotzky (Math. Dept.)	Prof.
	1	RAMSEY THEORY***	Elective	2		2	0	0	11	Ehud Friedgut (Math. Dept.)	Prof.
	2	INTRODUCTION TO NUMERICAL COMPUTING**	Elective	3	Linear Algebra (1) Infinitesimal Calculus (2)	3	0	0	18	Raanan Fatal	Dr.
	2	HI-TECH ENTREPRENEUR-SHIP (2)	Elective	4	Hi-Tech Entrepreneur-ship (1)	2	0	2	20	Ari Rappoport	Prof.
	2	INTRODUCTION TO INFORMATION THEORY***	Elective	4	Introduction to Probability Stat. for CS	2	2	0	51	Michael Ben-Or	Prof.
	2	INTRODUCTION TO NUMERICAL COMPUTING**	Elective	3	Linear Algebra (1) Infinitesimal Calculus (2)	3	0	0	18	Raanan Fatal	Dr.

	2	ADVANCED TOPICS IN MACHINE LEARNING (2)***	Elective	2	Introduction to Machine Learning	2	0	0	5	Amir Globerson Yair Weiss Shai Shwartz	Dr. Prof. Dr.
	2	STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE***	Elective	2		2	0	0	5	Guy Kindelr	Dr.
	2	POST PC COMPUTING: HUMAN-CENTRIC MOBILE COMPUTING***	Elective	3		3	0	0	50	Amnon Dekel	Dr.
	2	REAL TIME SYSTEMS***	Elective	3	Operating Systems	2	1	0	105	Tal Pasternak	Dr.
	2	ADVANCED COURSE IN MACHINE LEARNING***	Elective	2	Introduction to Machine Learning Introduction to Information and Learning Process	2	0	0	11	Shai Shwartz	Dr.
	2	ISSUES ON BORDER OF ECONOMICS & COMPUTATION***	Elective	2		2	0	0	65	Noam Nisan	Prof.
	2	MATHEMATICAL FOUNDATIONS OF ARTIFICIAL INTELLIGE***	Elective	2	Algorithms Computational Models, Computability and Complexity	2	0	0	37	Meir Reshef	Ph.D

	2	MEDICAL IMAGE PROCESSING***	Elective	3	Computer Graphics OR Image Processing	2	1	0	13	Leo Joskowicz	Prof.
	2	THEORETICAL FUNDAMENTALS OF DATABASES***	Elective	3	Databases	2	1	0	23	Yeoshua Sagiv	Prof.
	2	INTRODUCTION TO MULTIAGENT SYSTEMS***	Elective	2		2	0	0	67	Jeff Rosenschein	Prof.
	2	CONVEX OPTIMIZATION AND APPLICATIONS***	Elective	3		2	1	0	8	Ami Wiesel	Dr.
	2	COMPUTATIONAL PHOTOGRAPHY***	Elective	3	Image Processing	2	2 Every 2 weeks	0	23	Michael Werman Dani Lischinski Shmuel Peleg	Prof. Prof. Prof.
	2	ADVANCE COURSE IN EMBEDDED SYSTEMS***	Elective	3	Programming workshop in C Operating Systems Digital Computer Architecture	2	1	0	42	Omer Levi	M.Sc
	2	DATA ON THE WEB***	Elective	3	Databases	3	0	0	67	Sara Cohen	Prof.
	2	EXPERIMENTAL MATHEMATICS***	Elective	2		2	0	0	9	Michael Werman	Prof.
	2	ADVANCED ALGORITHMS***	Elective	3		3	0	0	26	Yair Bartel	Prof.

	2	TOPICS IN DISCRETE OPTIMIZATION***	Elective	3	Algorithms	3	0	0	19	Yuval Rabani	Prof.
	2	THEORY OF NEURAL NETWORKS 1***	Elective	4		3	1	0	22	Hanoch Gutfreund	Prof.
	2	HUMAN VISION: A COMPUTATIONAL APROACH***	Elective	2		2	0	0	85	Yair Weiss	Prof.
	2	INTRODUCTION TO PHYSICS WITH COMPUTER***	Elective	4		3	1	0	16	Asida Shimon (Phsysics)	Prof.
	2	PROBABILITY THEORY (2)***	Elective	3	Probability Theory (1) Measure Theory	3	0	0	7	Yuri Kifer (Math. Dept.)	Prof.
	2	MATHEMATICAL LOGIC (2)***	Elective	3	Mathematical Logic (1) OR Logic of Mathematical Structures	2	1	0	25	Ehud Hrushovski (Math. Dept.)	Prof.
	2	GAME THEORY (2)***	Elective	3	Game Theory (1)	2	1	0	16	Abraham Neyman (Math.Dept.)	Prof.
	2	COMBINATO-RICS***	Elective	4	Discrete Mathematics	3	1	0	22	Gil Kalai (Math. Dept)	Prof.
	2	TOPICS IN ADVANCED COMBINATO-RICS***	Elective	2		2	0	0	8	Nati Linial	Prof.
	2	TUTORIAL WORK***	Elective	2					0	Chosen by student	

	2	TUTORIAL WORK***	Elective	4					0	Chosen by student	
	2	TUTORIAL WORK***	Elective	6					0	Chosen by student	
	2	GRAPH THEORY***	Elective	3	Discrete Mathematics	3	0	0	47	Ehud Friedgut (Math. Dept.)	Prof.

* Courses 67316 and 67317 are half semester courses.

** Elective Courses. 1 course from those courses should be chosen (for students who take Computer Science as majoring)

*** Elective Courses to complete credits for Computer Science

Framework of study**: <u>single track</u>**/ double track/ other ____**<u>Computer Science - MSc</u>**_____

Year in Program	Semester	Course Title	Course Type (oblig./elective/ seminar/other)	No. of Credits	Prerequisites for Admission	Weekly Teaching Hours	Weekly Exercise Hours	Weekly Laboratory Hours	No. of Students	Teaching Staff	
										Name of staff member	Employment Degree
1	1	MATHEMATICAL TOOLS IN COMPUTER SCIENCE	Obligatory	4		3	1		46	Nati Linial	Prof.
	annual	DEPARTMENTAL COLLOQUIUM - COMPUTER SCIENCE	Obligatory	0		0	0		59	David Hay	Dr.
	2	FINAL M.SC EXAMINATION	Obligatory	0		0	0		0		
	The student must chose 1 Laboratory on his 1st or 2nd year										
	annual	DEVELOPMENT OF INTERNET SOFTWARE LAB*	Elective	5		0	0	5	0	Ari Rappoport	Prof.
	annual	IMAGE PROCESSING - LAB.*	Elective	5		0	0	5	0	Michael Werman	Prof.
	annual	LABORATORY IN MEDICAL IMAGE PROCESSING AND ITS A*	Elective	5		0	0	5	0	Leo Joskowicz	Prof.
	annual	LAB IN APPLICATION OF COMPUTER	Elective	5		0	0	5	0	Dorit Aharonov	Prof.
										Michael Ben-Or	Prof.
										Yair Bartal	Prof.

		THEORY*								Nati Linial	Prof.
										Alex Samorodnitsky	Prof.
										Orna Kupferman	Prof.
										Guy Kindler	Dr.
										Yuval Rabani	Prof.
										Eli Shamir	Prof.
	annual	LAB. IN MODERN DATABASES*	Elective	5		0	0	5	0	Sara Cohen	Prof.
	annual	Lab. in CS education*	Elective	5		0	0	5	0	Noam Nissan	Prof.
	annual	COMPUTATIONAL ASPECTS OF APPL. LINGUISTICS –LAB*	Elective	5		0	0	5	0	Ari Rappoport	Prof.
	annual	COMPUTER VISION – LAB*	Elective	5		0	0	5	0	Shmuel Peleg	Prof.
										Daphna Weinshall	Prof.
										Yair Weiss	Prof.
	annual	COMPUTER COMMUNICATION AND NETWORKING LAB*	Elective	5		0	0	5	0	Danny Dolev	Prof.
										David Hay	Dr.
	annual	DISTRIBUTED OPERATING SYSTEMS – LAB*	Elective	5		0	0	5	0	Amnon Barak	Prof.
	annual	CAD/CAM – LAB*	Elective	5		0	0	5	0	Michel Bercovier	Prof.
	annual	AVAILABILITY AND RELIABILITY OF DISTR. SYST – LAB*	Elective	5		0	0	5	0	Danny Dolev	Prof.
	annual	LAB IN ECONOMIC CONSIDERATION IN COMPUTATION*	Elective	5		0	0	5	0	Noam Nissan	Prof.

	annual	LAB IN EMBEDDED SYSTEMS*	Elective	5		0	0	5	0	Scott Kirkpatrick	Prof.
	annual	LABORATORY IN ARTIFICAL INTELLIGENCE*	Elective	5		0	0	5	0	Jeff Rosenchein	Prof.
	annual	SIGNAL PROCESSING AND OPTIMIZATION – LAB*	Elective	5		0	0	5	0	Ami Wiesel	Dr.
	annual	DATABASE AND THE INTERNET – LAB*	Elective	5		0	0	5	0	Yehoshua Sagiv	Prof.
	annual	COMPUTER GRPHICS LAB.*	Elective	5		0	0	5	0	Dani Lischinski	Prof.
										Raanan Fattal	Dr.
	annual	STATISTICAL & COMPUTATIONAL LEARNING LAB*.	Elective	5		0	0	5	0	Shai Shalev-Schwartz	Dr.
										Amir Globerson	Dr.
										Yair Weiss	Prof.
	annual	LAB IN COMPUTATIONAL NEUROSCIENCE AND LEARNING*	Elective	5		0	0	5	0	Naftali Tishby	Prof.
	The student must chose 1 Seminar on his 1st or 2nd year										
	1	COMPUTER VISION SEMINAR**	Elective	2		0	0	2	3	Michael Werman	Prof.
	2	ADVANCED SEMINAR IN A.I**	Elective	2		0	0	2	3	Jeff Rosenchein	Prof.
	1	ADVANCED TOPICS IN MACHINE LEARNING**	Elective	2		0	0	2	3	Naftali Tishby	Prof.
										Shai Shalev-Schwartz	Dr.
										Amir Globerson	Dr.
										Yair Weiss	Prof.

	2	ADVANCED TOPICS IN MACHINE LEARNING 2**	Elective	2		0	0	2	5	Shai Shalev-Schwartz	Dr.
										Amir Globerson	Dr.
										Yair Weiss	Prof.
	1	STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE (FAL**	Elective	2		0	0	2	1	Guy Kindler	Dr.
	2	STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE (SPR**	Elective	2		0	0	2	5	Guy Kindler	Dr.
	2	SEMINAR IN COMPUTATIONAL LINGUISTICS**	Elective	2		0	0	2	22	Ari Rappoport	Prof.
	1	ADVANCED SEMINAR IN COMPUTER GRAPHICS & COMPUTAT**	Elective	2		0	0	2	0	Dani Lischinski	Prof.
										Raanan Fattal	Dr.
	2	READING SEMINAR IN THEORY**	Elective	2		0	0	2	1	Dorit Aharonov	Prof.
	2	ADVANCED TOPICS IN COMPUTER VISION**	Elective	2		0	0	2	2	Shmuel Peleg	Prof.
										Daphna Weinshall	Prof.
	2	GEOMETRIC MODELING AND COMPUTATIONAL GRAPHIC – S**	Elective	2		0	0	2	2	Dani Lischinski	Prof.
										Raanan Fattal	Dr.

	1+2	DISTRIBUTED ALGORITHMS, NETWORKING AND SECURITY**	Elective	2		0	0	2	2	Danny Dolev	Prof.
	1	SEMINAR IN ADVANCED MEDICAL IMAGE PROCESSING AN**	Elective	2		0	0	2	4	Leo Joskowicz	Prof.
	1	SEMINAR ON DATABASE & THE INTERNET**	Elective	2		0	0	2	12	Yehoshua Sagiv	Prof.
										Sara Cohen	Prof.
	1	TEXT MINING FOR BUSINESS APPLICATIONS***	Elective	3		3	0	0	17	Ronen Feldman	Prof.
	1	HI-TECH ENTREPRENEURSHIP (1)***	Elective	2		2	0	0	42	Ari Rappoport	Prof.
	1	DISTRIBUTED ALGORITHMS***	Elective	3	Algorithms	3	0	0	21	Dan Dolev	Prof.
	1	COMPUTER AIDED GEOMETRY DESIGN AND MODELING***	Elective	3	Computer Graphics OR Introduction to Numerical Computing	2	1	0	2	Michel Bercovier	Prof.
	1	CRYPTO-GRAPHY***	Elective	3		3	0	0	5	Michael Ben-Or	Prof.
	1	ADVANCED TOPICS IN COMMUNICATION NETWORKS***	Elective	2		2	0	0	21	David Hay	Dr.

	1	ADVANCED DIGITAL CIRCUITS (VHDL)***	Elective	4		2	0	2	20	Max Nigri	B.Sc
	1	INTERNET TECHNOLOGIES***	Elective	3		3	0	0	120	Ohad Assulin	M.Sc
	1	INTRODUCTION TO MACHINE LEARNING**	Elective	5	Algorithms Data Structures Introduction to Probability Stat. for CS	3	2	0	70	Shai Shwartz	Dr.
	1	STATISTICAL SIGNAL PROCESSING***	Elective	3		3	0	0	5	Ami Wiesel	Dr.
	1	DIGITAL NETWORK IN MODERN TIME***	Elective	4	Algorithms	2	2	0	93	David Hay	Dr.
	1	INTRODUCTION TO QUANTUM COMPUTATION***	Elective	4	Algorithms	3	1	0	10	Michael Ben-Or	Prof.
	1	COMPUTATIONAL GEOMETRY***	Elective	3	Data Structures	2	1	0	12	Leo Joskowicz	Prof.
	1	HIGH-PERFORMANCE COMPUTING ON GPUS***	Elective	4		2	0	2	17	Amnon Barak	Prof.
	1	COMPUTER GRAPHICS***	Elective	4	Programming workshop in C++	2	2	0	33	Raanan Fattal	Dr.
	1	SIGNALS IN COMMUNICATION SYSTEMS***	Elective	4	Introduction to Linear Systems Random Signals & Variables	2	2	0	68	Kalet Yitzchak	Dr.

	1	ADVANCED SEMINAR IN COMPUTER GRAPHICS & COMPUTAT***	Elective	2		2	0	0	1	Dani Lischinski Raanan Fattal	Prof. Dr.
	1	GEOMETRIC METHODS IN THE THEORY OF ALGORITHMS	Elective	3		3	0	0	1	Yair Bartal	Prof.
	1	TOPICS IN COMMUNICATIONS ***	Elective	3		2	1	0	18	Kalet Yitzchak	Dr.
	1	PROBABILISTIC METHODS IN ARTIFICAL INTELLIGENCE***	Elective	4	Introduction to Probability Stat. for CS	2	2	0	21	Amir Globerson Gal Elidan	Dr. Dr.
	1	THE PROBABILISTIC METHOD***	Elective	3		3	0	0	24	Alex Samorodnizky	Prof.
	1	IMAGE PROCESSING***	Elective	4		2	2	0	73	Shmuel Peleg	Prof.
	1	HIGH-PERFORMANCE COMPUTING ON GPUS***	Elective	4		2	0	2	17	Amnon Barak .	Prof
	1	COMPUTER GRAPHICS***	Elective	4	Programming workshop in C++	2	2	0	33	Raanan Fattal	Dr.

	1	SIGNALS IN COMMUNICATION SYSTEMS***	Elective	4	Introduction to Linear Systems Random Signals & Variables	2	2	0	68	Kalet Yitzchak	Dr.
	1	ADVANCED SEMINAR IN COMPUTER GRAPHICS & COMPUTAT***	Elective	2		2	0	0	1	Dani Lischinski	Prof.
										Raanan Fattal	Dr.
	1	GEOMETRIC METHODS IN THE THEORY OF ALGORITHMS	Elective	3		3	0	0	1	Yair Bartal	Prof.
	1	TOPICS IN COMMUNICATIONS ***	Elective	3		2	1	0	18	Kalet Yitzchak	Dr.
	1	PROBABILISTIC METHODS IN ARTIFICAL INTELLIGENCE***	Elective	4	Introduction to Probability Stat. for CS	2	2	0	21	Amir Globerson	Dr.
										Gal Elidan	Dr.
	1	THE PROBABILISTIC METHOD***	Elective	3		3	0	0	24	Alex Samorodnizky	Prof.
	1	IMAGE PROCESSING***	Elective	4		2	2	0	73	Shmuel Peleg	Prof.
	1	RESEARCH SEMINAR IN FOUNDACION OF CS***	Elective	0 Seminar		0	0	0		Michael Ben-Or	Prof.
										Eli Shamir	Prof.

										Dorit Aharonov	Prof.
										Nati Linial	Prof.
										Noam Nisan	Prof.
										Yair Bartal	Prof.
										Yuval Rabani	Prof.
										Alex Samorodnizky	Prof.
	1	INTRODUCTION TO ARTIFICIAL INTELLIGENCE**	Elective	4		2	2	0	78	Jeff Rosenschein	Prof.
	1	INTRODUCTION TO THEORETICAL COMPUTER SCIENCE***	Elective	3		3	0	0	18	Guy Kindelr	Dr.
	1	FORMAL VERIFICATION OF REACTIVE SYSTEMS***	Elective	2		2	0	0	17	Orna Kupferman	Prof.
	1	COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS***	Elective	5		3	0	3	154	Uri Heinemann	Ph.D
	1	INTRODUCTION TO SOFTWARE AND SYSTEMS SECURITY***	Elective	5		4	0	1	17	Yaron Inger	M.Sc
										Ohad Fried	M.Sc

	1	THEORY OF NEURAL NETWORKS 2***	Elective	4	Theory of Neural Networks 1	3	1	0	11	Haim Sompolinsky	Prof.
	1	INTRODUCTION TO INFORMATION AND LEARNING PROCESS***	Elective	4		2	2	0	12	Amir Globerson	Dr.
	1	GAME THEORY (1)***	Elective	3	Infinitesimal Calculus (2) Linear Algebra (2)	2	1	0	53	Abraham Neyman	Prof.
	1	CODING THEORY***	Elective	2	Algebraic Structures (1) Algebraic Structures (2)	2	0	0	4	Alex Lubotzky	Prof.
	2	HI-TECH ENTREPRENEUR-SHIP (2)	Elective	4	Hi-Tech Entrepreneur-ship (1)	2	0	2	20	Ari Rappoport	Prof.
	2	INTRODUCTION TO INFORMATION THEORY***	Elective	4	Introduction to Probability Stat. for CS	2	2	0	51	Michael Ben-Or	Prof.
	2	INTRODUCTION TO NUMERICAL COMPUTING**	Elective	3	Linear Algebra (1) Infinitesimal Calculus (2)	3	0	0	18	Raanan Fatal	Dr.
	2	ADVANCED TOPICS IN MACHINE LEARNING (1)***	Elective	2	Introduction to Machine Learning	2	0	0	4	Naftali Tishbi	Prof. .
										Yair Weiss	Dr.
										Amir Globerson	Dr

										Shai Shwartz	Dr
	2	ADVANCED TOPICS IN MACHINE LEARNING (2)***	Elective	2	Introduction to Machine Learning	2	0	0	5	Amir Globerson	Dr.
										Yair Weiss	Prof.
										Shai Shwartz	Dr.
	2	POST PC COMPUTING: HUMAN-CENTRIC MOBILE COMPUTING***	Elective	3		3	0	0	50	Amnon Dekel	Dr.
	2	REAL TIME SYSTEMS***	Elective	3	Operating Systems	2	1	0	105	Tal Pasternak	Dr.
	2	SEMINAR IN COMPUTATIONAL LINGUISTICS***	Elective	2		2	0	0	22	Ari Rappoport	Prof.
	2	ISSUES ON BORDER OF ECONOMICS & COMPUTATION***	Elective	2		2	0	0	65	Noam Nisan	Prof.
	2	MATHEMATICAL FOUNDATIONS OF ARTIFICIAL INTELLIGE***	Elective	2	Algorithms Computational Models, Computability and Complexi	2	0	0	37	Meir Reshef	Ph.D
	2	MEDICAL IMAGE PROCESSING***	Elective	3	Computer Graphics OR Image Processing	2	1	0	13	Leo Joskowicz	Prof.
	2	MODERN CONTROL SYSTEMS***	Elective	4	Introduction to Linear Systems	4	0	0	2	Evgeni Perelroyzen	Dr.

	2	THEORETICAL FUNDAMENTALS OF DATABASES***	Elective	3	Databases	2	1	0	23	Yeoshua Sagiv	Prof.
	2	INTRODUCTION TO MULTIAGENT SYSTEMS***	Elective	2		2	0	0	67	Jeff Rosenschein	Prof.

* Elective lab course. 1 lab from those courses should be chosen.

** Elective Seminars. 1 seminar from those seminars should be chosen.

*** Elective Courses to complete credits for Computer Science M.Sc

7.2 - Teaching Staff – Tables no. 2A-2D
Academic Year of Evaluation -_(2011-12)

Table 2A

Senior Academic Staff Employed[1]

Name of Staff Member			Employment Status	Part of Full time Position **in** the **Institution**[2]		Part of Full Time Position **in** the **Program**		Additional Employment (outside the institution)			Area of Specialization	Courses taught by the staff member			Additional Tasks in Institution	No. of Students Receiving Guidance (*)[3]	
								Name of Employer	Part of Full Time Position			Name of Course	Weekly Hours	Total Weekly Hours for Staff member		2nd Degree	3rd Degree
First	Family	Title (Dr, Ms, Mr)		Weekly Hours	Per Cent	Weekly Hours	Per Cent		Weekly Hours	Per Cent							
Dorit	Aharonov	Prof.	Professor (maternity leave-during the 1st semester**)**								Quantum Computation & Algorithms	1. LAB IN APPLICATION OF COMPUTER THEORY	5	7		1	3
												2. READING SEMINAR IN THEORY	2				
												3. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				
Michael	Ben-Or	Prof.	Professor								Computational Complexity, Algebraic Complexity, Cryptography, Quantum Computation	1. CRYPTOGRAPHY	3	13	**Senate of the Hebrew University Standing Committee of the**	1	
												2. INTRODUCTION TO INFORMATION THEORY	2				
												3. INTRODUCTION TO QUANTUM COMPUTATION	3				

[1] Senior academic staff include (according to the PBC/VATAT definitions) the following 4 degrees: Lacturer; Senior Lecturer; Associate Professor; Full professor.

[2] In case the employment status in the instituion and in the program are identical, this data can appear only once (please specify that this data is identical).

[3] These columns are relevant only if the program has a masters and doctoral degrees.

												4. LAB IN APPLICATION OF COMPUTER THEORY	5		**Senate Academic Policy Committee of the University**		
												5. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				
Yair	Bartal	Prof.	Associate Professor								On-line & Networking Algorithms, Combinatorial Structure of Metric Spaces	1. GEOMETRIC METHODS IN THE THEORY OF ALGORITHMS	3	11	Library committee	0	0
												2. LAB IN APPLICATION OF COMPUTER THEORY	5				
												3. ADVANCED ALGORITHMS	3				
												4. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				
Michel	Bercovier	Prof.	Emeritus									1.COMPUTER AIDED GEOMETRY DESIGN AND MODELING	3	8			
												CAD/CAM - LAB	5				
Amir	Globerson	Dr.	Senior Lecturer								machine learning, probabilistic models, artificial intelligence, natural language processing, neural computation, large scale optimization.	1. ADVANCED TOPICS IN MACHINE LEARNING	2	15	1st year BSc students advisor	3	5
												2. ADVANCED TOPICS IN MACHINE LEARNING 2	2				
												3. RANDOM SIGNALS & VARIABLES	2				
												4. PROBABILISTIC METHODS IN ARTIFICAL INTELLIGENCE	2				
												5. STATISTICAL & COMPUTATIONAL LEARNING LAB.	5				
												6. INTRODUCTION TO INFORMATION AND LEARNING PROCESS	2				
Danny	Dolev	Prof.	Professor								Distributed Algorithms, Reliability of Distributed	1. DISTRIBUTED ALGORITHMS	3	19	**The Authority**	4	4

											System	2. OPERATING SYSTEMS	2		**for Libraries**		
												3. COMPUTER COMMUNICATION AND NETWORKING LAB	5				
												4. AVAILABILITY AND RELIABILITY OF DISTR. SYST - LAB	5				
												5. DISTRIBUTED ALGORITHMS, NETWORKING AND SECURITY	4				
Michael	Werman	Prof.	Professor								Computer Vision, Geometry & Algorithms, Robotics	1. COMPUTER VISION SEMINAR	2	12		3	1
												2. IMAGE PROCESSING - LAB.	5				
												3. COMPUTATIONAL PHOTOGRAPHY	3				
												4. EXPERIMENTAL MATHEMATICS	2				
Ami	Weisel	Dr.	Senior Lecturer								Signal processing and wireless communication	1. STATISTICAL SIGNAL PROCESSING	3	16	**University Appointments and Promotions Committee**	1	0
												2. CONVEX OPTIMIZATION AND APPLICATIONS	3				
												3. SIGNAL PROCESSING AND OPTIMIZATION - LAB	10				
Yair	Weiss	Prof.	Professor								Human and Machine Vision, Learning, Neural Computation	1. INTRO TO DIGITAL SIGNAL PROCESSING	2	18	**The Association for Research Students**	1	3
												2. ADVANCED TOPICS IN MACHINE LEARNING	2				
												3. ADVANCED TOPICS IN MACHINE LEARNING 2	2				
												4. COMPUTER VISION - LAB	5				
												5. STATISTICAL & COMPUTATIONAL LEARNING LAB.	5				

												6. HUMAN VISION: A COMPUTATIONAL APROACH	2				
Daphna	Weinshall	Prof.	Professor								Computer and Biological Vision, Learning	1. SEMINAR FOR OUTSTANDING UNDERGRADUTATE STUDENTS	1	10	Head of Computer Science	2	3
												2. RESEARCH SEMINAR IN COMPUTER SCIENCE	2				
												3. ADVANCED TOPICS IN COMPUTER VISION	2				
												4. COMPUTER VISION - LAB	5				
David	Hay	Dr.	Senior Lecturer								Computer Networks, Network algorithms, High performance switching and routing	1. ADVANCED TOPICS IN COMMUNICATION NETWORKS	2	9	Colloquim coordinator	2	1
												2. DIGITAL NETWORK IN MODERN TIME	2				
												3. COMPUTER COMMUNICATION AND NETWORKING LAB	5				
												4. DEPARTMENTAL COLLOQUIUM - COMPUTER SCIENCE	0				
Leo	Joskowicz	Prof.	Professor								Intelligent Computer-Aided Design, Geometric Reasoning, Computer-Assisted Surgery, Robotics	1. COMPUTATIONAL GEOMETRY	3	13		6	4
												2. LABORATORY IN MEDICAL IMAGE PROCESSING AND ITS A	5				
												3. MEDICAL IMAGE PROCESSING	3				
												4. SEMINAR IN ADVANCED MEDICAL IMAGE PROCESSING AN	2				
Sara	Cohen	Prof.	Associate Professor								Databases, The Internet	1. DATABASES	3	13	2nd and 3rd year Bsc students advisor **University**	1	1
												2. LAB. IN MODERN DATABASES	5				
												3. DATA ON THE WEB	3				

												4. SEMINAR ON DATABASE & THE INTERNET	2		**Conference Committee**		
Nati	Linial	Prof.	Professor								Computer Science Theory, Combinatorics, Graph Theory, Algorithms,Bioinformatics	1. LAB IN APPLICATION OF COMPUTER THEORY	5	10		1	7
												2. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				
												3. MATHEMATICAL TOOLS IN COMPUTER SCIENCE	3				
												4. TOPICS IN ADVANCED COMBINATORICS	2				
Dani	Lischinski	Prof.	Professor								Computer Graphics, Visualization, Image & Video Processing	1. INTRODUCTION TO COMPUTER SCIENCE	4	18	**Doctorate Committee**	7	2
												2. ADVANCED SEMINAR IN COMPUTER GRAPHICS & COMPUTAT	2				
												3. COMPUTATIONAL PHOTOGRAPHY	3				
												4. TOPICS IN GEOMETRIC AND GRAPHIC MODELLING	2				
												5. GEOMETRIC MODELING AND COMPUTATIONAL GRAPHIC - S	2				
												6. COMPUTER GRPHICS LAB.	5				
Noam	Nissan	Prof.	Professor								*Computer Theory, Computational Economics, The Internet, Electronic Commerce*	1. INTRODUCTION TO COMPUTER SCIENCE	3	15		2	1
												2. ISSUES ON BORDER OF ECONOMICS & COMPUTATION	2				
												3. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				

												4. Lab. in CS education	5					
												5. LAB IN ECONOMIC CONSIDERATION IN COMPUTATION	5					
Alex	Samorodnitsky		Professor								*Theory of Computer Science, Coding Theory, Combinatorics*	1. DATA STRUCTURES	2	10	Head of Computer Engineering program **Natural Sciences Curriculum Committee**	1	1
												2. LAB IN APPLICATION OF COMPUTER THEORY	5					
												3. THE PROBABILISTIC METHOD	3					
												4. RESEARCH SEMINAR IN FOUNDACION OF CS.	0					
Dana	Porat	Dr.	Senior Lecturer								Wideband Communication Systems, Wireless Communication, Information TheoryRadio Propagation, Communication Engineering	1. ENGINEERING PROJECT AND WORKSHOPS - I	2	10		2	1
												2. ENGINEERING PROJECT AND WORKSHOPS - II	8					
Raanan	Fattal	Dr.	Associate Professor								Image Processing, Computer Vision, Computer Graphics and Numerical analysis	1. INTRODUCTION TO NUMERICAL COMPUTING	3	14	Advisor – BSc combined program Computer Science and Design - Bezalel	2	2
												2. COMPUTER GRAPHICS	2					
												3. ADVANCED SEMINAR IN COMPUTER GRAPHICS & COMPUTAT	2					
												4. GEOMETRIC MODELING AND COMPUTATIONAL GRAPHIC - S	2					
												5. COMPUTER GRPHICS LAB	5					

Dror	Feitelson	Prof	Associate Professor								Performance evaluation, especially workload modeling and the interactions of systems with their workloads; scheduling and resource management in parallel and other systems; software engineering and evolution	Sabbatical				3	1
Shmuel	Peleg	Prof.	Professor								Image Processing and Computer Vision	1. COMPUTATIONAL PHOTOGRAPHY	3	12	ועדת בינוי	1	1
												2. IMAGE PROCESSING	2				
												3. ADVANCED TOPICS IN COMPUTER VISION	2				
												4. COMPUTER VISION - LAB	5				
Nir	Friedman	Prof.	Professor								*Artificial Intelligence, Machine Learning, Probabilistic Reasoning,Bayesian Networks,Learning Probabilistic Models, Computational Biology, Genetics*	1. ADVANCED SEMINAR IN COMPUTATIONAL BIOLOGY	2	18	Head of Computational Biology program	2	4
												2. COMPUTATIONAL METHODS IN MOLECULAR BIOLOGY LAB	8				
												3. RESEARCH METHODS IN COMPUTATIONAL BIOLOGY	2				
												4. COMUTATIONAL METHODS IN MOLECULAR BIOLOGY	6				
Orna	Kupferman	Prof.	Professor								Computer-aided Design and Verification	1. COMPUTER SCIENCE - FAMILY TRAIL	2	14	**University Appointments and Promotions Committee Corner Stone Committee**	2	3
												2. LAB IN APPLICATION OF COMPUTER THEORY (yearly)	10				
												3. FORMAL VERIFICATION OF REACTIVE SYSTEMS	2				

Guy	Kindler	Dr.	Senior Lecturer								Complexity theory, analysis of Boolean functions.	1. COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXI	3	15		1	2
												2. STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE (FAL	2				
												3. STUDENTS SEMINAR THEORY OF COMPUTER SCIENCE (SPR	2				
												4. LAB IN APPLICATION OF COMPUTER THEORY	5				
												5. Introduction to Theoretical Computer Science	3				
Scott	Kirkpatrick	Prof.	Professor								*Embedded Computing, Complexity of Large Scale Systems, Statistical Mechanics*	1. ENGINEERING PROJECT AND WORKSHOPS - I	2	15		5	2
												2. ENGINEERING PROJECT AND WORKSHOPS - II	8				
												3. LAB IN EMBEDDED SYSTEMS	5				
Yuval	Rabani	Prof.	Professor								*Theory of algorithms, computational complexity, discrete optimization, computational aspects of metric geometry*	1. ALGORITHMS	3	11	MSc advisor	1	1
												2. LAB IN APPLICATION OF COMPUTER THEORY	5				
												3. RESEARCH SEMINAR IN FOUNDACION OF CS.	0				
												4. TOPICS IN DISCRETE OPTIMIZATION	3				
Jeff	Rosenschein	Prof.	Professor								Artificial Intelligence, Multi-agent Systems	1. ADVANCED SEMINAR IN A.I	2	11	Head of School of Engineering and Computer Science	2	4
												2. INTRODUCTION TO MULTIAGENT SYSTEMS	2				

												3. INTRODUCTION TO ARTIFICIAL INTELLIGENCE	2					
												4. LABORATORY IN ARTIFICAL INTELLIGENCE	5					
Ari	Rappoport	Prof.	Associate Professor								Computer Graphics, Geometric Modeling, CAD/CAM	1. DEVELOPMENT OF INTERNET SOFTWARE LAB	5	18	PhD studnts - Advisor	5	5
												2. HI-TECH ENTREPRENEURSHIP (1)	2					
												3. HI-TECH ENTREPRENEURSHIP (2)	4					
												4. SEMINAR IN COMPUTATIONAL LINGUISTICS	2					
												5. COMPUTATIONAL ASPECTS OF APPL. LINGUISTICS -LAB	5					
Yehoshua	Sagiv	Prof.	Professor								Databases, Logic Programming, Expert Systems	1. DATABASES	3	13		2		
												2. THEORETICAL FUNDAMENTALS OF DATABASES	3					
												3. SEMINAR ON DATABASE & THE INTERNET	2					
												4. DATABASE AND THE INTERNET - LAB	5					
Shai	Shalev Schwarz	Dr.	Senior Lecturer								Machine learning, statistical learning theory, online prediction, optimization	1. INTRODUCTION TO MACHINE LEARNING	3	14	MSc advisor	4	2	
												2. ADVANCED TOPICS IN MACHINE LEARNING	2					
												3. ADVANCED TOPICS IN MACHINE LEARNING 2	2					
												4. ADVANCED COURSE IN MACHINE LEARNING	2					
												5. STATISTICAL & COMPUTATIONAL LEARNING LAB.	5					

Amnon	Shashua	Prof.	Professor								Geometric and photometric relations between 3D objects and their 20 images, visual recognition under varying viewing positions and illumination conditions and representation of multiple images	Sabbatical					
Naftali	Tishby	Prof.	Professor								Machine Learning & Computational Learning Theory, Dynamical Systems & Signal Processing, Computational Neuroscience, Bioinformatics, Speech and Language Processing	1. INTRODUCTION TO LINEAR SYSTEMS	3	21		3	8
												2. ADVANCED TOPICS IN MACHINE LEARNING	2				
												3. LAB IN COMPUTATIONAL NEUROSCIENCE AND LEARNING	5				
												4. Models of perception-action cycles	2				
												5. DYNAMIC SYSTEMS AND CONTROL	3				
												6. MUSIC & BRAINS	2				
												7. TUTORIAL COURSE: SELECTIVE TOPICS IN NEURAL COMP	2				
												8. Interfaces between Experiments and Theory in Bra	2				

Table 2B

Junior Academic Staff Employed

Name of staff member			Employment Status	Part of Full Time Position **in** the **Institution**[1]		Part of Full Time Position **in** the **Program**		Additional Employment (outside the institution)			Area of Specialization	Courses taught by the staff member			Additional Tasks in Institution
								Name of Employer	Part of Full Time Position			Name of Course	Weekly Hours	Total Weekly Hours for Staff member	
First	Family	Title		Weekly Hours	Per Cent	Weekly Hours	Per Cent		Weekly Hours	Per Cent					
Michael	Schapira	Dr.	Lecturer (full time starting academic year 2012/13)								Networking systems research, computational economics and game theory	1. ADVANCED TOPICS IN COMMUNICATION NETWORKS	2		

[1] In case the employment status in the instituion and in the program are identical, this data can appear only once (please specify that this data is identical

Table 2C

Adjunct Teaching Staff - Senior

Name of Teacher			Employment Status	Yearly Teaching Units	Area of Specialization	Courses taught by the teacher	Additional Tasks in Institution
First	Family	Academic degree					
Elhanan	Elboher	MSc	Teaching Assistant	8.8	Computer Science	67829 IMAGE PROCESSING	None
Almagor	Shaull	MSc	Teaching Assistant	8.8	Computer Science	67521 COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXI	None
Aronshtam	Lior	MSc	Teaching Assistant	8.8	Computer Science	67109 DATA STRUCTURES	None
Aran	Dvir	MSc	Teaching Assistant	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE	None
Birnbaum	Aharon	MSc	Teaching Assistant	8.8	Computer Science	67546, 67547 ENGINEERING PROJECT AND WORKSHOPS 1,2	None
Goldstein	Amit	MSc	Teaching Assistant	6.6	Computer Science	67609 COMPUTER GRAPHICS	None
Ganz	Maor	MSc	Teaching Assistant	8.8	Computer Science	67504 ALGORITHMS	None
Heinemann	Uri	MSc	Teaching Assistant	8.8	Computer Science	67925 COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS	None
Weiss	Yaacob	MSc	Teaching Assistant	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE	None

Vaizman	Yonatan	MSc	Teaching Assistant	6.6	Computer Science	67316, 67317 PROGRAMMING WORKSHOP IN C AND C++	None
Weizman	Lior	MSc	Teaching Assistant	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE	None
Weiner	Assaf	MSc	Teaching Assistant	5.5	Computer Science	76552 WORKSHOP IN COMPUTATIONAL BIOSKILLS	None
Cohen	Noa	MSc	Teaching Assistant	8.8	Computer Science	67125 INTRODUCTION TO OBJECT ORIENTED	None
Lev	Omer	MSc	Teaching Assistant	8.8	Computer Science	67808 OPERATING SYSTEMS	None
Zwecher	Elchanan	MSc	Teaching Assistant	6.6	Computer Science	67652 RANDOM SIGNALS & VARIABLES	None
Levi	Effi	MSc	Teaching Assistant	8.8	Computer Science	67310 INTRODUCTION TO LINEAR SYSTEMS	None
Luria	Tzur	MSc	Teaching Assistant	8.8	Computer Science	67504 ALGORITHMS	None
Nehama	Ilan	MSc	Teaching Assistant	6.6	Computer Science	67865 MATHEMATICAL TOOLS IN COMPUTER SCIENCE	None
Sabato	Sivan	MSc	Teaching Assistant	8.8	Computer Science	67808 OPERATING SYSTEMS	None
Pochter	Nir	MSc	Teaching Assistant	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE	None
Freedman	Gilad	MSc	Teaching Assistant	8.8	Computer Science	67316, 67317 PROGRAMMING WORKSHOP IN C AND C++	None

Klein	Avital	MSc	Teaching Assistant	11	Computer Science	76558 COMUTATIONAL METHODS IN MOLECULAR BIOLOGY	None
Kronman	Achia	MSc	Teaching Assistant	8.8	Computer Science	67316, 67317 PROGRAMMING WORKSHOP IN C AND C++	None
Cario	Cobi	MSc	Teaching Assistant	8.8	Computer Science	67200 DIGITAL COMPUTERS ARCHTECTURE	None
Rosenbaum	Dan	MSc	Teaching Assistant	6.6	Computer Science	67567 INTRO TO DIGITAL SIGNAL PROCESSING	None
Tzachy	Reinman	MSc	Teaching Assistant	8.8	Computer Science	67130 INTRODUCTION TO COMPUTER SCIENCE	None
Schwartz	Roy	MSc	Teaching Assistant	8.8	Computer Science	67125 INTRODUCTION TO OBJECT ORIENTED	None
Shini	Mohanad	MSc	Teaching Assistant	8.8	Computer Science	67200 DIGITAL COMPUTERS ARCHTECTURE	None
Adjuct external staff							
Pasternak	Tal	Dr.	Adjunct lecturer	3*	Cyber-Physical Systems	67631 REAL TIME SYSTEMS	None
Falik	Ohad	M.Sc	Adjunct lecturer	2*	Computer Architecture	67200 DIGITAL COMPUTERS ARCHTECTURE	None
Dekel	Amnon	Dr.	Adjunct lecturer	3*	Mobile Computing	67625 POST PC COMPUTING: HUMAN-CENTRIC MOBILE COMPUTI	None

Levi	Omer	M.Sc	Adjunct lecturer	2*	Design and Implementation of Embedded Systems	67744 ADVANCE COURSE IN EMBEDDED SYSTEMS	None
Kaufman	Netanel	M.Sc	Adjunct lecturer	1*	Design and Implementation of Embedded Systems	67744 ADVANCE COURSE IN EMBEDDED SYSTEMS	None

* Frontal weekly teaching hours

Adjunct Teaching Staff - Junior

Name of Teacher			Employment Status	Yearly Teaching Units	Area of Specialization	Courses taught by the teacher	Additional Tasks in Institution
First	Family	Academic degree					
Inger	Yaron	B.Sc.	Lecturer	4.4	Computer Science	67928 INTRODUCTION TO SOFTWARE AND SYSTEMS SECURITY	None
Assulin	Ohad	B.Sc.	Lecturer	4.4	Computer Science	67555 INTERNET TECHNOLOGIES	None
Fried	Ohad	B.Sc.	Lecturer	4.4	Computer Science	67928 INTRODUCTION TO SOFTWARE AND SYSTEMS SECURITY	None

Aaronson	Yair	B.Sc.	Grader	8.8	Computer Science	67925 COMPUTER CONS. WORKSHOP: FROM NAND TO TETRIS 67808 OPERATING SYSTEMS	None
Arjevani	Yossi	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67109 DATA STRUCTURES	None
Gutin	Jenia	B.Sc.	Grader	8.8	Computer Science	67316 PROGRAMMING WORKSHOP IN C 67125 INTRODUCTION TO OBJECT ORIENTED	None
Huberman	Inbar	B.Sc.	Grader	8.8	Computer Science	67316 PROGRAMMING WORKSHOP IN C 67125 INTRODUCTION TO OBJECT ORIENTED	None
Hirschfeld	Dafna	B.Sc.	Grader	8.8	Computer Science	67504 ALGORITHMS 67808 OPERATING SYSTEMS	None
Levy	Efrat	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67125 INTRODUCTION TO OBJECT ORIENTED	None

Lewenberg	Yoad	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67808 OPERATING SYSTEMS	None
Mizrahi	Moran	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67200 DIGITAL COMPUTERS ARCHTECTURE	None
Milchgrub	Alon	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67521 COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXI	None
Kingsley	Jacob	B.Sc.	Grader	8.8	Computer Science	67316, 67317 PROGRAMMING WORKSHOP IN C AND C++ 67808 OPERATING SYSTEMS	None
Rubinstein	Dana	B.Sc.	Grader	4.4	Computer Science	67109 DATA STRUCTURES	None
Alroy	Maya	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE 67808 OPERATING SYSTEMS	None
Gonen	Alon	B.Sc.	Grader	8.8	Computer Science	67577 INTRODUCTION TO MACHINE LEARNING	None
Wald	Yoav	B.Sc.	Grader	8.8	Computer Science	67101 INTRODUCTION TO COMPUTER SCIENCE	None

Zakay	Netanel	B.Sc.	Grader	8.8	Computer Science	67594 DIGITAL NETWORK IN MODERN TIME	None
Halamish	Shulamit	B.Sc.	Grader	8.8	Computer Science	67504 ALGORITHMS	None
Tehori	Roni	B.Sc.	Grader	8.8	Computer Science	67829 IMAGE PROCESSING 67109 DATA STRUCTURES	None
Cohen	Liron	B.Sc.	Grader	8.8	Computer Science	67842 INTRODUCTION TO ARTIFICIAL INTELLIGENCE	None
Mehrzadi	David	B.Sc.	Grader	8.8	Computer Science	67125 INTRODUCTION TO OBJECT ORIENTED	None
Mosheiff	Yonatan	B.Sc.	Grader	8.8	Computer Science	67504 ALGORITHMS 67521 COMPUTATIONAL MODELS, COMPUTABILITY AND COMPLEXI	None
Peled	Yuval	B.Sc.	Grader	8.8	Computer Science	67504 ALGORITHMS 67109 DATA STRUCTURES	None
Peled	Shir	B.Sc.	Grader	8.8	Computer Science	67548 INTRODUCTION TO INFORMATION THEORY	None
Floman	Omri	B.Sc.	Grader	8.8	Computer Science	67504 ALGORITHMS	None
Peles	Oren	B.Sc.	Grader	8.8	Computer Science	67200 DIGITAL COMPUTERS ARCHITECTURE	None
Rosenfeld	Nir	B.Sc.	Grader	8.8	Computer Science	67109 DATA STRUCTURES	None

7.3 - Table no. 3
Average Score of Teaching Surveys in the Last 5 Years
Department of Computer Science

	1st semester				2nd semester			
	Required	**Electives**	**Seminars**	**Workshops/ Laboratories**	**Required**	**Electives**	**Seminars**	**Workshops/ Laboratories**
Academic Year 2007								
Mean	16.44±1.79	15.76±2.09	19.42	-------	15.63±2.18	15.91±1.95	-----	------
Reported courses	8	14	1	-------	8	12	-----	------
Total #	8	16	6	10	8	19	5	10
Academic Year 2008*								
Academic Year 2009								
Mean	16.18±3.36	15.72±2.23	15.89	11.18	16.90±1.96	14.88±3.45	16.87	----
Reported courses	8	16	1	-----	6	18	2	-----
Total	9	18	4	10	7	21	6	10
Academic Year 2010								
Mean	14.30±0.04	15.69±3.20	----	-----	16.86±2.75	16.23±1.94	----	-----
Reported courses	9	16	----	---	5	22	-----	-----
Total	10	16	4	10	6	25	8	10
1-Academic Year 2011								
Mean	15.49±2.43	16.31±2.32	------	-----	16.68±2.07	15.75±2.10	18.17	------
Reported courses	7	18	------	-----	5	18	2	------
Total	7	21	7	10	5	25	10	7

*Due to the staff strike in the academic year 2008 there is not enough information regarding teaching evaluation