

 **THE OPEN UNIVERSITY OF ISRAEL**

**The Avinoam Adam Department
of Natural Sciences**

SELF-EVALUATION REPORT

Chemistry

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The Open University of Israel
CHEMISTRY SELF-EVALUATION REPORT
Executive Summary

The University: The Open University of Israel (OUI) is unique on the Israeli academic scene. Although it resembles other universities in its pursuit of excellence in teaching and research, it differs from them in its educational mission – to widen access to quality higher education, and in its method of instruction – distance teaching. The OUI is dedicated to the creation of university-level materials that are suitable for independent study, and to the development and implementation of versatile means of support for individual learning.

To date, the OUI has prepared over 700 university-level courses. It offers a variety of study programs toward Bachelor's and Master's degrees in a wide range of disciplines in Sciences, Humanities, Social Sciences and Engineering. The academic development and teaching activities are carried out by seven academic departments, backed by a sophisticated, centralized administrative system.

In keeping with its mission, the OUI has created a singular framework for university studies that enables uncompromising adherence to pre-set, high standards, without imposing admission requirements on undergraduates, without dictating specific yearly loads and, for the most part, without demanding regular classroom attendance. Student screening at the OUI is solely through performance.

The elaborate teaching method developed by the OUI allows students to study throughout Israel and abroad, alongside other personal and vocational obligations.

The gates of the OUI are open to all; however, only individuals who are intellectually inclined to acquire up-to-date advanced knowledge, capable of doing so, and willing to work hard, can meet the strictly maintained level of academic excellence.

OUI study materials are prepared by field specific experts. They undergo thorough (internal and external) peer review to ensure their scholarly value. Extensive additional measures and quality control procedures are employed to ascertain their didactic merit as well. As a result, OUI texts are highly regarded and widely used in all Israeli universities.

Students: In the 2008-2009 academic year, close to 46,000 students took OUI undergraduate courses and more than 3,250 took graduate courses (in full-time-equivalent terms, this represents about 18,884 undergraduates); 2,386 students completed various undergraduate programs and 333 received Master's degrees.

Studies at the OUI: Unlike traditional universities, at the OUI, students enroll in courses each semester. Study materials (books, study guides, readers, etc.) are mailed to them before the beginning of the semester with instructions and homework assignments for the entire semester. They study mainly on their own, and submit assignments according to a predetermined schedule. The individual learning process is supported by detailed personal feedback on assignments and by various learning aids, printed and electronic, mailed or delivered via the course websites. Tutorials held at study centers throughout the country help to clarify and practice applications of the subject matter and encourage socialization with peers. At the end of the semester, students take monitored written final exams. Since the assignments and exams are

prepared in advance, the same pre-set high standard is preserved throughout the country, regardless of study center or tutor.

Academic staff: The academic staff of each department consists of senior faculty and academic teaching staff – course coordinators and tutors. The senior faculty (about 80 members in all) is the academic leadership; its members initiate study programs, and are in charge of the development of all course materials. Senior faculty members are also responsible for quality control. In particular, they supervise all ongoing instructional activities, by guiding and monitoring the performance of course coordinators (about 300), who, in turn, are responsible for the smooth, effective running of the teaching system. Each course offered by the OUI has a course coordinator, usually a member of the academic teaching staff, whose task is to hire and supervise tutors, prepare new assignments and exams for each semester, maintain the course website and enrich it with appropriate materials. Tutors (about 1000 in all), whose number in each course depends on the number and geographical dispersion of students enrolled, conduct group tutorial sessions, grade homework assignments and provide personal support when necessary.

Technologies: Extensive administrative and instructional services are provided to students and academic staff via the internet. The OUI invests considerable efforts in learning technologies: *Shoham*, the Center for Technology in Distance Education, investigates and adapts or creates platforms and technologies for use on course websites. Faculty and teaching staff take part in the endeavor to develop educational technologies and use them wisely, creatively, innovatively and effectively. The versatile outcomes provide a multitude of means to remain academically updated, to liven up the lonely process of individual learning and to bridge physical distances.

The Avinoam Adam Department of Natural Sciences: The Avinoam Adam Department of Natural Sciences, one of seven academic departments at the OUI, was established in 1997, when the OUI was reorganized on a departmental basis. It was named after the late Prof. Avinoam Adam in 2008. The first departmental Bachelor's degree (BA in Natural Sciences) was offered in 1984. In 1994, a BA degree in Life Sciences was offered. In 2000, the OUI was authorized to offer an MA in Biological Thought. Since 2003, the department has offered dual-disciplinary and interdisciplinary Bachelor's degrees, first in Life Sciences. In 2006, the department was authorized to grant a dual-disciplinary BSc with a track in Chemistry and in 2008, with Physics. In 2009, all the undergraduate degrees granted by the department were changed from BA degrees to BSc degrees.

The department offers single and dual-disciplinary undergraduate programs in Physics, Chemistry and Life Sciences and a graduate program in Biological Thought; 138 undergraduate courses in chemistry, physics, earth sciences and life sciences, of which 16 are laboratory courses; and 10 are graduate-level courses. In the last 5 years, 334 students graduated from the department, which represents 3.3% of OUI graduates during that period. In 2009, 1,745 students (3,643 enrollments) took undergraduate courses offered by the department.

Senior faculty members in the department engage in research and initiate, develop, maintain and monitor courses and programs of study. There are currently only 10 senior faculty members in the department and one guest lecturer. Two members retired at the end of 2009; two others will be retiring shortly. Two new members will join the department in 2011: one Physical Chemist and one who will replace the head of the MA program in Biological Thought. The Chemistry group includes only two senior faculty members, which reflects on the program because it does not include an

Organic Chemist. Next year, the department hopes to recruit two more faculty members: one Biologist and one Organic Chemist.

Most of the course coordinators in the department hold PhD degrees (90%); the rest have Master's degrees. In 2009, there were 38 course coordinators in the department, 10 of whom were responsible for Chemistry courses, and who all served as tutors for at least one study group. Additional study groups in Chemistry courses met throughout the country with 36 tutors, who hold at least a Master's degree.

Chemistry programs, students and graduates: A basic Chemistry course was among the first courses offered by the OUI. With the development of additional Chemistry courses, students who were granted a BA degree in Natural Sciences could focus their studies on Chemistry. Graduates of this program were admitted to other universities for continuing education, usually without conditions or with very few qualifying courses. In 2006, the CHE authorized the OUI to grant degrees in a dual-disciplinary track in Chemistry. Since these programs were offered, the number of Chemistry students has risen by more than 50%.

All Chemistry programs include basic courses in Physics and Mathematics necessary as background to intermediate and advanced courses, and seminar courses that provide students with an updated perspective of specific research topics. English proficiency, knowledge of basic computer applications and bibliographic training in the library are required for all degrees.

For the purpose of this report, we defined three groups of Chemistry students according to the Chemistry courses that they passed. In 2009, 87 students were defined as Chemistry students (as compared with 51 in 2005), 176 students took a partial program in Chemistry and 569 students had passed at least one Chemistry course. Chemistry students are relatively older than their peers in other institutions, over half are male, almost half live outside of the major cities, and 16.1% did not have a high school matriculation certificate when they began their studies. Thus, the Chemistry programs fulfill the OUI goal of increased access to higher education.

The average grade of graduates over the past five years in the various undergraduate Chemistry programs is 80.02. The OUI's open admissions policy combined with its high academic requirements results in a relatively high dropout rate in students' first courses at the OUI. As a result, students who are able to graduate are usually highly motivated and have high intellectual abilities. Because many of our students work full time during their studies, the average duration of studies of our graduates in the last 5 years was over 8 and a half years.

Research: Research in the department is carried out by members of the senior faculty and the academic teaching staff, most notably by those among them who hold a PhD. In the last five years, members of the department won 16 grants from competitive funds including the Israel Science Foundation and the European Council. During this period, faculty members published numerous papers, cooperated with colleagues in Israel and abroad, presented their work at international conferences, served on editorial boards of journals, and took part in the organization of conferences and meetings.

Quality control mechanisms: Due to the nature of distance teaching, the OUI has developed quality control mechanisms for almost every product, process and function. These mechanisms enable the University to continuously examine its strengths and weaknesses and to address problems when necessary.

The department maintains rigorous academic standards with respect to courses and teaching. We maintain an ongoing quality assurance and control system whereby courses undergo extensive refereeing during the development phase, and periodic assessment concerning adequacy, relevance and scientific rigor while the course is being taught. Furthermore, the quality of teaching is routinely monitored by means of student feedback gathered each semester, samples of assignments and examinations, summary statistics regarding students' achievements, and visits paid to tutorial sessions by the course coordinators and the senior faculty. All course coordinators are evaluated every year. The self-evaluation process highlighted our strengths and weaknesses, and motivated thinking about ways to overcome weak areas.

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