



**Committee for the Evaluation of  
Biotechnology & Biotechnology Engineering Study Programs**

**Tel Hai Academic College  
Department of Biotechnology  
Evaluation Report**

**April 2013**

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## **Chapter 1: General Background**

At its meeting on July 25, 2010, the Council for Higher Education (CHE) decided to evaluate study programs in the field of Biotechnology and Biotechnology Engineering during the academic year 2012.

Following the decision of the CHE, the Minister of Education, who serves ex officio as Chairperson of the CHE, appointed a Committee consisting of:

- **Prof. Moshe Rosenberg**, Department of Food Science & Technology, UC Davis, USA, Committee Chair<sup>1</sup>
- **Prof. Gad Galili**, Department of Plant Sciences, Weizmann Institute of Science, Israel
- **Prof. Milica Radisic**, Institute of Biomaterials and Biomedical Engineering, Department of Chemical Engineering and Applied Chemistry, University of Toronto, Canada<sup>2</sup>
- **Prof. Joseph Shiloach**, Biotechnology Core Lab, NIH- National Institutes of Health, USA
  
- *Ms. Yael Elbocher* - Coordinator of the Committee on behalf of the CHE.

Within the framework of its activity, the Committee was requested to:<sup>3</sup>

1. Examine the self-evaluation reports, submitted by the institutions that provide study programs in Nutritional Sciences, and to conduct on-site visits at those institutions.
2. Submit to the CHE an individual report on each of the evaluated academic units and study programs, including the Committee's findings and recommendations.
3. Submit to the CHE a general report regarding the examined field of study within the Israeli system of higher education including recommendations for standards in the evaluated field of study.

The entire process was conducted in accordance with the CHE's Guidelines for Self-Evaluation (of October 2010).

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<sup>1</sup> During the first round of visits Prof. Carl Batt of Cornell University was Committee Chair. During the period between the two rounds of visits Prof. Batt resigned due to incomparable disagreements

<sup>2</sup> Prof Radisic joined the committee for its second round of visits, thus did not take part in the evaluation of Tel Hai Academic College, ORT Braude College and The Hebrew University of Jerusalem

<sup>3</sup> The Committee's letter of appointment is attached as **Appendix 1**.

## **Chapter 2-Committee Procedures**

The Committee held its first meetings on March 14, 2012, during which it discussed fundamental issues concerning higher education in Israel, the quality assessment activity, as well as Biotechnology and Biotechnology Engineering Study programs.

In March 2012, the Committee held its first round of visits of evaluation, and visited Tel Hai Academic College, ORT Braude College and the Hebrew University of Jerusalem. In June 2012 the Committee conducted its second evaluation cycle, and visited Ben-Gurion University of the Negev, Hadassah Academic College Jerusalem, Tel Aviv University and The Technion. During the visits, the Committee met with various stakeholders at the institutions, including management, faculty, staff, and students.

This report deals with the Department of Biotechnology at Tel Hai Academic College which took place on March 15, 2012.

The schedule of the visit is attached as **Appendix 2**.

The Committee thanks the management of Tel Hai Academic College and the Department of Biotechnology for their self-evaluation report and for their hospitality towards the Committee during its visit at the institution.

## **Chapter 3: Evaluation of Biotechnology Program at Tel Hai Academic College**

*\* This Report relates to the situation current at the time of the visit to the institution, and does not take account of any subsequent changes. The Report records the conclusions reached by the Evaluation Committee based on the documentation provided by the institution, information gained through interviews, discussion and observation as well as other information available to the Committee.*

### **3.1 Executive Summary**

The biotechnology program (BTP) at Tel Hai Academic College (THAC) was approved in 1994 and the department of Biotechnology has a permanent authorization for its B.Sc. study program since 2005. The program also has a temporary authorization for its M.Sc. program (for three years) since 2009. During the evaluated years the program has exhibited growth and the number of students enrolled in the B.Sc. study program in the academic year 2010/2011 was 205. In addition to its undergraduate studies program, the BTP offers M.Sc. degree, either with or without thesis, in two tracks. The BTP has to develop a focused mission statement, an objective-driven strategic plan and well defined study tracks. The 3-year B.Sc. program is successful in educating and training its students to assume professional positions in the biotechnology industry or to pursue graduate studies. In general, the curriculum of the B.Sc. program is appropriate and adequate, however, it requires some revision, enhancement and updating. Faculty members of the program are highly capable and dedicated to promote and ensure success of their students. The student population of the program is very diverse and all of the different strata of the Israeli society are well represented. The program provides students with special needs or knowledge gaps with opportunities and tools to address their needs and succeed. The College has a unique arrangement with MIGAL Research Institute, where many of the faculty members of the BTP hold research positions and conduct competitive high quality research activities. The graduate students as well as some of the undergraduate students of the BTP conduct their research at MIGAL. THAC, in general, and the BTP in particular would like to enhance and promote research activities. Researchers of the BTP have demonstrated increasing rate of success in competing on research grants, both nationally and internationally. Although some research activities of faculty members of colleges positively impact the quality of the program, the College and the BTP have to remember that their main focus should be directed at the undergraduate studies program rather than at

developing research program. The promotion process has to be based on assessing success of faculty members in meeting reachable goals without penalizing them for not meeting unattainable objectives. A concept of establishing an individual-specific job description has to be developed, implemented and used in assessing success of faculty members.

Overall, the committee feels that the BTP at the THAC has strong foundations and academic merits, and that it trains its students to successfully meet needs of the modern biotechnology industry and research in Israel.

The committee has identified several curricular, personnel and infrastructural needs that have to be addressed.

Major recommendations are:

- Develop a concise and focused mission statement and a detailed strategic plan.
- Establish an effective Industry Advisory Board to the program.
- Establish well designed study tracks.
- Do not develop a Ph.D. program.
- Revise, enhance and update the curriculum according to what is detailed in the committee's report.
- Introduce and implement the Learning Outcomes Assessment concept.
- Develop and introduce faculty-member-specific job description and develop a clear set of guidelines that identify and specify, for each promotion steps in each of the academic ranks, the requirements for a successful promotion; once the latter has been developed, fully implement a promotion process that is based on assessing success in meeting the criteria and objectives that are stated in the individual-specific job description.

### **3.2 - Background**

Tel Hai Academic College (THAC) is located in the Upper Galilee, about two kilometers north of Kiryat Shemona. Tel Hai Academic College was initially established in 1959 as an enrichment center for the region's residents and served as a branch of the Tel-Aviv University until 1978 and later, until 1996, as a branch of the Haifa University. In 1996 the College became an independent institution for higher education, and was officially authorized to grant undergraduate degrees in March 1997.

The College consists of two faculties – the Faculty of Social Sciences and Humanities, and the Faculty of Sciences and Technology. The College confers B.Sc. and B.A. degrees, in either single or double major programs, as well as M.A. and M.Sc. degrees. During the academic year 2010-2011 the College's total number of students was 4,500 out of which about 3,150 were full-time students.

The biotechnology program (BTP) was approved in 1994 and conferred its first B.Sc. degrees in 1997. The Department of Biotechnology has a permanent authorization for its B.Sc. study program since 2005 and a temporary authorization for its M.Sc. program (for three years) since 2009.

During the evaluated period of time (2006-2011) the B.Sc. study program at the BTP exhibited growth and the number of students enrolled in the program grew from 176 in 2006/2007 to 205 in 2010/2011. The annual number of graduates (during the years 2006-2011) ranged from 107 (in 2005/2006) to 47 in 2009/2010.

### **3.3 - Mission, Goals and Aims**

The committee has found the mission statement and objectives of the program to be too broad and too general. The committee holds the opinion that a concise and focused mission statement, reflecting the collective vision of the program's faculty members and aligned with the mission statement of the College is needed. The committee recognizes that introducing a broad spectrum of topics and directions related to modern biotechnology to the program carries value. However, the committee strongly believes that the program has to identify the specific fields in biotechnology where its strength and competitive edge can be

highlighted. These fields should then be addressed in the mission statement and be translated into specific objectives related to all of the academic and infrastructural aspects of the program. It has to be noted that the areas of focus and strength should also reflect the role of the program in meeting specific biotechnology-related needs in the Upper Galilee and general needs of the biotechnology and related industries in Israel.

Currently, the BTP does not have a strategic plan aimed at meeting its goals. The committee holds the opinion that a tangible strategic plan with specific long- and short-term objectives, addressing all of the academic- and infrastructural-related aspects of the program, is critically needed. The committee believes that developing and implementing such a plan will effectively tool the program to better assess and design its curriculum, will allow effective planning of faculty and staff recruitment and will also allow planning the program's growth in terms of both number of students and infrastructure.

It is apparent from information included in the SER and from what has been conveyed to the committee during its visit to the BTP that research activities of its faculty members and students are highly regarded by the program and the college administration, and that a desire to promote and further develop the research component of the BTP exists. The committee has noted that indications suggesting the latter could not be found in the stated mission and goals of the program. In fact, terms such as “research program” or “research activities” are not mentioned in the mission statement of the program. Although the program awards a M.Sc. degree, the mission statement is focused only on the undergraduate studies program. It is important that the BTP will develop a mission statement and strategic plan that address and prioritize all of the academic and infrastructural aspects of the program.

The Biotechnology program at THAC reaches out to communities and enterprises, both in the region and beyond, and maintains a certain level of interactions with the biotechnology and related industries. However, an Industry Advisory Board (IAB) to the BTP does not exist. An effective IAB can provide the program with a comprehensive feedback about its adequacy and relevance and can partner with the program in shaping its scope and growth. The IAB can also assist the program in assessing and enhancing its success in meeting current and future

needs of the Biotechnology Industry in Israel. Such boards are common at similar academic programs and have been proven to be a powerful and effective means that allow establishing meaningful dialogues with stakeholders. The committee believes that establishing such a board will also enhance the visibility of the program, thus providing means to address challenges related to the remote geographical location of the program.

**Recommendations:**

**Immediate (full implementation within one year)**

- Identify and design the specific competitive strength and desired biotechnology-related directions of the program.
- Develop a concise and focused mission statement.
- Develop and implement a strategic plan, consisting of tangible short- and long-term objectives, aimed at meeting the goals and directions included in the mission statement.
- Establish an effective Industry Advisory Board to the program.

### **3.4 - The Study Program**

#### **3.3.1 The B.Sc. Program**

The curriculum of the 3-year undergraduate studies of the BTP has been designed to educate and train its students to either successfully assume positions in the biotechnology and related industries or continue their studies towards graduate degrees (M.Sc. and Ph.D.) Successful completion of the B.Sc. study program requires accumulating 132 credit points (CP) out of which 115 and 17 CP are acquired by successfully completing compulsory and elective courses, respectively. Exact sciences related courses account for 24 CP; Chemistry related courses account for 29 CP and Biological sciences related courses account for 53.5 CP.

In general, the program's curriculum is adequate for educating students in the main disciplines associated with the field of modern Biotechnology, however, it suffers from deficiencies and has to be reviewed and revised as detailed below.

The laboratory courses that are included in the curriculum account for 9.5 CP (about 7% of the total CP). In almost all cases, the laboratory sessions are of only 1 hour each (0.5 CP) and represent a laboratory course sequence of traditional and common Bio-Sci. curriculum. Very few of the laboratory courses address analytical approaches and tools that are of importance to modern biotechnology. The proportion of chemistry laboratory courses is very low (1 CP) and the need for some of the laboratory courses, such as two separate courses "from cell to organism- invertebrates" and "from cell to organism – vertebrates" is questionable. The committee considers the latter a deficiency and holds the opinion that the laboratory component of the curriculum has to be revised and strengthened by introducing elements that are directly related to modern biotechnology.

Students are required to accumulate 17 CP from elected courses, out of which 2 CP are to be from courses offered by the faculty for Social & Humanities Sciences. The list of elective courses that are offered by the BTP includes courses that are of limited importance to an undergraduate studies program in biotechnology, on one hand, and a deficiency in biotechnology-related courses, on the other hand. The committee considers this aspect of the program as a weakness and has identified a need to introduce elective courses that are directly related to modern biotechnology.

The committee has noticed that since 1993 no significant changes or updates have been introduced to the compulsory courses that are included in the curriculum. It is imperative that the all of the courses that are included in the curriculum will be reviewed and assessed for their relevance and adequacy. It is of prime importance that both compulsory and elective components of the curriculum will be designed and adjusted to allow delivering high-quality training in modern biotechnology. The committee holds the opinion that the curriculum has to be built to meet the specific needs and objectives of well defined study tracks.

The committee has become aware, through its meetings at the college and by reviewing information included in the SER, that during recent years the program has experienced a certain dynamic where different study tracks were introduced, and later some of them were canceled and replaced by other study tracks. In 2005 a study track in Analytical Biotechnology was introduced and then closed in 2007; for a few years, course clusters in “medical biotechnology” and environmental biotechnology” were offered but were later canceled. The BTP is currently focused on a new study track in “Agricultural Biotechnology” that is aimed at meeting specific needs of the region. It seems that the study tracks of the program are not being developed as a result of a thorough analysis and in accordance with a mission statement and strategic plan. The latter is of a concern to the committee that holds the opinion that decisions regarding new study tracks should be based on a thorough analysis, and should be reflected in the program’s strategic plan. Decisions about study tracks should be carefully assessed in light of the program’s human resources, physical infrastructure, desired growth and its competitiveness among similar programs in the nation.

The committee was impressed by the extent to which the critical thinking skills of the students are built, especially in the seminar courses and commends the BTP on its structured efforts directed at building their communication skills through required presentations. The committee is also impressed by the special opportunities that are offered by the program in promoting and enhancing the success of disabled students or of those with learning difficulties. The committee commends the program for its sensitivity, dedication, compassion and success related to these challenges.

About 87% of the courses included in the curriculum are instructed by faculty members that are engaged in research and are thus able to introduce and integrate into the courses that they instruct current topics, methodologies and advancements. The committee identified the latter as strength of the program.

Communication skills of students in both writing and oral presentation have to be developed. The committee is satisfied with the extent to which students are trained in preparing and delivering oral presentations, however, a course aimed at developing the

technical writing skills, in both Hebrew and English, is missing from the curriculum. Ethical issues are of critical importance to the field of biotechnology yet they are not addressed by the curriculum.

The undergraduate BTP offers (as an elective course) opportunities to its students to carry out an independent research project, for 30 days under the supervision of faculty members of the BTP with research laboratories at MIGAL and their graduate students. During the evaluated academic years (2006-2011), 134 students were enrolled in this course (19 to 40 students annually) and the average final grade of this course ranged from 92.0 to 93.4%. This 7-credit unit elective course provides the students with a unique first-hand experience in phrasing research questions, designing experiments, collecting and processing data and reporting research results. The committee welcomes the requirement that the research results will be communicated both in writing (final report) and in a 15 min oral presentation. The committee perceives the Research Project to be a potential strength of the program and strongly recommends that it should be included in the curriculum as a compulsory requirement rather than an elective. The latter will also allow addressing the current situation where students that are enrolled in the Research Project course have very limited opportunities to take other elective courses at the BTP (only 8 CP). The committee is concerned by the fact that about 20% of the students that had taken the Research Project course expressed dissatisfaction (specific reasons not provided to the committee). The committee has identified a need to evaluate and address, without delay, the reasons that have led to the significant level of dissatisfaction.

The committee recognizes the instrumental role of MIGAL in providing the research and instructional platforms that enable offering and conducting the Research Project course.

**Recommendations:**

**Immediate (full implementation within 1-2 years)**

- Establish well designed study tracks and clearly define the course path (cluster) for each of the tracks.
- Introduce to the curriculum of the first year of studies a compulsory course in technical writing (in both English and Hebrew).

- Introduce a compulsory course in “Ethics in Biotechnology”.
- Revise, enhance and update the curriculum according to what is detailed in section 3.3.1.
- Identify and address reasons responsible for significant dissatisfaction with the undergraduate research project and change the course from an elective to a compulsory course

### **3.3.2. The Graduate (M.Sc.) program**

The Master program in Biotechnology (M.Sc.) was established in 2009 and offers both thesis and non-thesis M.Sc. tracks. The program consists of and is critically dependent on a strong collaboration between THAC and MIGAL Research Institute, where the research of all the graduate students is carried out. The committee recognizes the opportunity provided by this collaboration however, would like to remind the BTP and its administrators that the main effort of colleges should be focused on its undergraduate study program. This effort has to be directed at dissemination of knowledge and at educating and training graduates who can effectively meet the needs of BT industry while also prepare them for pursuing higher degrees.

Since 2009, the total number of students admitted to the program ranged from 14 to 22. The number of students that selected the thesis track ranged from 10 to 17 while that of those admitted to the non-thesis track ranged from 4 to 11. The course work required in the thesis and non-thesis M.Sc. tracks accounts for 30 and 42 credit points, respectively. The non-thesis track requires a semester long independent research (24 weekly hours at least). The committee has found the requirements for completion of both tracks to be appropriate and in agreement with requirements at comparable programs elsewhere. The committee has found the structure of the grading structure of the graduate studies to be appropriate and adequate.

The committee reviewed the curriculum of the M.Sc. study program and holds the opinion that it should be significantly enhanced and revised. The curriculum has to be strengthened by adding compulsory advanced courses in basic and applied sciences (such as

biochemistry, physical chemistry, experimental design and biostatistics, bioethics, etc.). An advanced course in the practical and analytical concepts and methodologies related to modern biotechnology has to be introduced as well. In order to maintain the overall number of required credit points, some of the current required courses can be offered as electives.

The opportunities provided for graduate students to take elective undergraduate courses should be carefully re-assessed in light of its potential adverse impact on the learning outcomes (of both undergraduate and graduate students). The committee holds the opinion that if not carefully addressed, the academically-heterogeneous nature of the student population (enrolled in a given course) may compromise the value of the course to both undergraduate and graduate students.

The committee strongly believes that the curriculum of the Master program can be enhanced by developing it to consist of a few well defined course paths (or clusters), directed at the specific needs of graduate students with interest in different fields that are associated with modern biotechnology. The latter requires, similar to what has been recommended for the undergraduate study program, that the BTP will hold a thorough discussion aimed at developing several study tracks, directed at specific fields in modern biotechnology, where the competitive strength of the program can be highlighted.

It has been communicated to the committee during its visit that a plan to offer graduate studies towards a Ph.D. degree in Biotechnology exist at THAC. As detailed in Chapter 3.6 of this report, the committee recognizes the importance of research to both faculty members and students and applauds the research accomplishments of the BTP. However, the committee does not support the plan directed at developing and offering a Ph.D. degree in Biotechnology at THAC and holds the opinion that the academic and research infrastructure that is needed in order to develop a high quality Doctorate program does not exist in the Biotechnology program at THAC. The committee also holds the opinion that Doctorate programs should be developed at research universities and not in colleges.

Information included in the SER suggests that the BTP would like to enhance interest in its non-thesis graduate studies program, arguing that M.Sc. without thesis may assist those seeking promotion in the industry. The committee holds the opinion that addressing this opportunity requires developing a more structured and focused curriculum for this track (maybe even in several industry-sector-specific course clusters). Additionally, the committee believes that a pre-requisite (for admission) of a proven experience (3 or 5 years) in the industry will be beneficial to this specific track.

The committee has also become aware, through information included in the SER, that the BTP is currently considering an opportunity to develop academic programs that are likely to draw demand. The BTP would like to include such a program in the non-thesis track and design it to offer students applied training in fields such as genetic counseling, specialization in animal diseases, modern agriculture, and medical nutrition. The committee is concerned about this direction and holds the opinion that it has to be approached very carefully, and believes that it will significantly increase the proportion of effort directed by instructors at parts of the program that are not included in the undergraduate study curriculum. The committee holds the opinion that decisions about such directions should be made only if they are aligned with the strategic plan of the program (once it has been established). Yet additionally, the committee believes that such programs should not be integrated into the graduate studies (M.Sc.). Such programs should be offered as a series of Extension Courses. The latter is a very common and successful practice at numerous programs in the USA.

#### Recommendations:

##### **Immediate** (full implementation within one year)

- The committee strongly recommends **against** developing and offering a Ph.D. study program at the BTP.
- Design the graduate study program and its defined study tracks to meet the mission statement and objectives of the strategic plan of the program.

- Graduate study programs without thesis, which are directed at meeting interests of different sectors and/or individuals from the industry, should be offered as series of Extension courses rather than becoming an integral part of the M.Sc. study program.

**Intermediate** (full implementation within 2-3 years)

- Review, revise and enhance the curriculum of the Master program, as detailed in section 3.3.2.

### **3.4 Teaching & Learning Outcomes**

The teaching methods and tools that are used in the classroom and in laboratories of the BTP are appropriate and adequate, and the committee is satisfied with the way information and teaching technology is utilized by the program. The committee has found the grading system and practices of the program to be appropriate and adequate.

The evaluation of the teaching is based on feedback provided by students in the form of course evaluation questionnaires. It has become apparent that, due to budgetary and other issues, only partial data has been collected and processed during recent years. The data that was shared with the committee suggested that the program's instructors have gained (consistently) high acceptability and satisfactory scores among the students.

The committee is concerned by the fact that the teaching quality of TAs has not been assessed at all during several years. The latter is of specific importance in light of information conveyed to the committee about challenges related to the teaching capabilities of some of the TAs.

Currently, the learning outcomes of the BTP are being assessed based on student's grade. In recent years it has been recognized that grades alone cannot serve as effective tools in assessing learning outcomes. Institutions of higher education in the USA and Europe have recognized that a full commitment to teaching and learning must include assessing and documenting what and how much students are learning and using this information to improve the educational experiences. A detailed concept of Learning Outcome Assessment, that allows defining desired learning outcomes (for each course) and quantifying the success

with which these outcomes have been acquired by students, has been developed and introduced in numerous academic programs.

### **Recommendations:**

**Immediate** (full implementation within one year)

- Assessed on a regular basis the teaching quality of TAs involved in the program.

**Intermediate** (full implementation within 2-4 years)

- Introduce and implement the Learning Outcomes Assessment concept as the main tool for evaluating the learning outcomes of all of the courses and learning experiences that are offered by both undergraduate and graduate study programs.

## **3.5 Human Resources**

### **3.5.1 Faculty members**

The faculty members of the BTP consist of 23 senior faculty members (PH.D), 7 senior teachers (PH.D), 26 assistants (B.Sc and M.Sc) 12 Senior Adjunct teaching staff (PH.D) and 16 Junior teaching staff (B.Sc and M.Sc). For its M.Sc program the college has 9 senior faculty members (Ph.D) and 2 senior adjunct teaching staff (Ph.D). In addition to their teaching duties within the BTP, senior faculty members of the program also teach basic courses to students of other departments in the faculty of sciences.

The committee has found the academic level of the faculty members (at all ranks) to be adequate for meeting the programs goals. Information included in the SER indicated that, in general, the faculty members of the program are capable instructors. All of the faculty members with whom the committee met expressed dedication and enthusiasm to their teaching responsibilities.

Faculty members of the program carry a heavy teaching load that is rank-specific and 19 of the 23 senior faculty members of the program hold (separate from their teaching appointments in the College) positions at MIGAL Research Institute, where they are actively involved, to different extent, in research. Research is an important component of a program in biotechnology and although the committee recognizes the unusual nature of the arrangement between the College and MIGAL, the committee appreciates the fact that it enables faculty members and students of the BTP to become actively involved in research.

Information included in the SER indicated that the general guidelines for promotion (including tenure) take into account both the research and teaching activities of the individuals. The SER also details the mechanisms and procedures that are being used in the faculty promotion process. The committee understands that because of the nature of the College and its unique relationships and collaboration with MIGAL, where the research is being conducted, the “flexible approach” (outline in the SER) is reasonable.

Meeting with the junior faculty of the BTP revealed to the committee that they were not fully aware of specific guidelines for their promotion and tenure process but expressed confidence in the process.

In light of the required heavy teaching load, the challenges associated with conducting research on campus and the unusual structure of the research platform available through MIGAL, the committee’s opinion is that promotion of faculty members will be based on assessing the success in meeting objectives defined by an individual-specific job description.

The committee holds the opinion that it is imperative for the program (and thus the College) to introduce faculty member-specific job descriptions where the proportion of effort, to be directed at each of the academic activities (teaching, research and community service), are clearly defined. The latter has to be established through a dialogue with each faculty member. This will allow better and more flexible distribution of teaching load among faculty members and will also allow tailoring individual-specific activities profile that reflects the capabilities and aspirations of individual faculty members. Once the concept of individual-specific job description has been defined and accepted, a clear set of guidelines that identify and specify, for each promotion step in a given academic rank, the requirements for successful promotion should be developed and published.

The committee is convinced that this approach is of significant importance especially in colleges, where the primary goal of the program should be the dissemination of existing knowledge rather than the generation of new knowledge.

The committee would like to highlight the fact that the concept of introducing faculty member-specific job descriptions is common in many highly reputable universities all over the world. The committee recognizes the fact that implementing its recommendation

requires a dialogue between all parties (both on campus and at the government level) that are involved in defining job description of faculty members, and hopes that such an effort will be launched without delays.

The committee holds the opinion that the promotion process of faculty members should include solicitation of assessment letters from external reviewers, as detailed in the recommendations below.

**Recommendations:**

**Immediate** (full implementation within one year)

- Pending the introduction of tangible opportunities for conducting research as part of the criteria for promotion, and until the concept of individual-specific job description has been implemented, base the promotion of faculty members, at all ranks, only on their accomplishments in teaching, community service and outreach activities.

**Intermediate** (full implementation within 2-4 years)

- Develop and introduce faculty-member-specific job descriptions where the proportion of effort to be allocated to each of the academic and administrative activities of the faculty member are clearly defined
- Once the concept of individual-specific job description has been established and defined, develop and implement a clear set of guidelines that identify and specify, for each promotion step in each of the academic ranks, the requirements for a successful promotion.
- After establishing and introducing the revisions, as described above, fully implement a promotion process that is based on assessing success in meeting the criteria and objectives that are stated in the individual-specific job description.
- Include in the promotion process of faculty members (at all ranks) with a significant research component (more than 20%), and faculty members that are considered for promotion to the professorial rank a dossier evaluation by 3 outside reviewers, to be solicited from relevant academic programs abroad.

### **3.5.2 Students**

The committee met with several undergraduate and graduate students of the program and was impressed by the maturity, openness and seriousness of these students. The students were enthusiastic about the program and expressed satisfaction with its quality and content. The students seemed to appreciate the efforts made by the College, the BTP and the academic staff to ensure their success in the program. Both undergraduate and graduate students described a very unique and strong bond that they have developed with the program, the college and the region. Many of the undergraduate students expressed an interest in pursuing graduate studies and a significant proportion of them indicated Tel Hai to be their graduate study program of choice.

The population of students that apply to the BTP at Tel Hai consists of those who can, in potential, be admitted to Israeli universities and those having matriculation and/or psychometric test results that fall short of what is required by similar programs at universities.

During the academic years 2006-2011, the number of students that applied to the program ranged from 158 to 238, the admission rate ranged from 50 to 66.4% and the proportion of admitted students that enrolled in the program ranged from 66 to 78%. The minimum requirements for admission include a score of at least 570 in the psychometric tests, a minimum grade average of 85 in the matriculation tests and a minimum grade of 75 in the 4-unit mathematics matriculation tests. The average score of psychometric test of students admitted to the program during the evaluated years ranged from 594.4 to 632.8, and the average grade of the matriculation test of these students ranged from 92.7 to 94.8.

A given proportion of the incoming (and admitted) students suffer from a knowledge gap in the exact and biological sciences. The college has introduced some remedial courses aimed at closing this gap as well as allowing students to extend their studies over four years. Except for one year, the attrition rate of the BTP (after the first year of studies) during the evaluated period of time ranged from about 15 to 25%. The latter has been attributed to a variety of reasons related to both academic level of the students and to their interest in biotechnology.

The committee met with Alumni of the B.Sc. study program that are currently pursuing a M.Sc. degree at the BTP. These students indicated that the B.Sc. program has prepared them very well for pursuing graduate studies.

The committee is impressed by effort made by the program to enhance the knowledge-base of incoming students with limited background in the exact and biological/chemical sciences. The introduction of a summer preparatory study program in 2011 is commended.

Both undergraduate and graduate students indicated that the program has met their academic and professional expectations and that they were confident that the BTP in THAC is tooling them to become competitive professionals. Results of a recent survey, among 320 alumni, indicated the success of the B.Sc. BTP in training and preparing its graduates for their professional careers. The proportion of those holding a job, studying, or holding a job and studying was 48.1%, 25.0% and 22.8%, respectively. About 72% of those who returned the questionnaire found their studies at the BTP relevant to their work. Out of the 320 participants, 156 (48.75%) had pursued a Master degree and 27 (17.3%) pursued doctoral studies, at different academic programs, mostly in Israel. The results of the survey also indicated that: 89% of the alumni were satisfied with their studies in the BTP; 91.5% were satisfied with the instructors of the program and 94.5% of the alumni were satisfied with the atmosphere of the studies and with Tel-Hai College. The Committee welcomes the decision of the program to enhance communication with its alumni.

### **3.6 Research**

THAC does not have a research infrastructure of its own and thus all of the research activities of the Biotechnology program are carried out at the laboratories of MIGAL Research Institute, located 10 min driving distance from the College, in the town of Kiryat Shemona. This research infrastructure is not an integral part of THAC yet it serves faculty members of the BTP that hold research positions at this institute, M.Sc. students of the BTP, and B.Sc. students of the BTP that are enrolled in the elective Research Project course. Research activities of the BTP researchers are funded by research grants awarded to them by national and international competitive research funding agencies. A Joint Research Authority has been

recently established by Tel-Hai Academic College and MIGAL in order to promote the process of submitting competitive research proposals to such agencies.

Total research funds from competitive international agencies that were awarded to researchers of the BTP increased from \$ 155,000 in 2006 to \$ 255,000 in 2010 while total research funds awarded by governmental and public agencies increased from \$ 600,000 in 2006 to more than one million dollars in 2010.

Research directions that are addressed by researchers of the BTP include: chemistry, immunology, microbiology molecular genetics, and cancer; in most cases, the research is applied in nature. A significant part of the research program is focused on agricultural biotechnology and, in many cases, is aimed at meeting specific agricultural- and biotechnology-related needs of the northern part of Israel. Researchers of the BTP maintain research collaborations with academic departments and research institutes, both nationally and internationally.

Research conducted by the researchers of the BTP since 2006 has yielded 292 peer-reviewed publications that have been published in different international scientific journals, including some highly reputable in the field. The number of peer-reviewed publications that were produced annually per researcher during the years 2006-2011 ranged from less than 1 to about 5 (2 researchers).

The committee recognizes the importance of the research opportunities provided by MIGAL to the BTP and the positive impact of this research on the teaching quality in the Biotechnology program. The committee also recognizes the value and positive impact the research has on the professional development of both faculty members and students of the program. However, the committee would like to caution the program and remind both the administrators and faculty members about their role and commitment to the mission of colleges in Israel, namely, undergraduate education and training. The committee thus strongly believes that the main effort of the faculty members of the program will be directed at further developing the undergraduate study program of the BTP rather than at their individual research programs at MIGAL.

The committee recognizes the unusual contractual involvement of faculty members of the BTP in research carried out at a research institute that is not bound by the academic regulations and principles of the college. The committee holds the opinion that in order to prevent difficulties and challenges, such as conflict of interest, the implications of this situation have to be properly addressed and monitored.

**Recommendations:**

**Immediate** (full implementation within one year)

- The committee strongly recommends that proper mechanisms aimed at avoiding conflict of interests, when instruction and supervision of undergraduate and graduate students of the BTP by employees of MIGAL are considered, will be established, implemented and monitored.

**3.7 Infrastructure**

In general, the CHE Biotechnology Evaluation Committee has found the infrastructure of the Western Campus of the College and its teaching facilities and means to be appropriate and satisfactory. The committee feels that the teaching laboratories of the BTP are properly equipped to meet the goals of the curriculum. The committee was impressed by the services, learning tools and the access to information (both on and off-campus) provided by the library to students and staff.

The laboratories, instrumentation, and infrastructure available to researchers and students of the BTP at MIGAL are appropriate and allow conducting mission-oriented research projects. During the visit to THAC, a future plan to develop a process that will ultimately allow MIGAL Research Institute to migrate from its current off-campus location into the campus was shared with the Committee by the senior administration of the College. The committee welcomes this plan and believes that the relocation of MIGAL is likely to positively impact the Biotechnology Program of the College.

### **3. 8 Quality assessment**

The committee commends the program for preparing a thoughtful and detailed Self Evaluation Report. The program has demonstrated quality-driven philosophy and significant capabilities in self assessment and continuous improvement. The committee is satisfied with the leadership and team- work effort that have been demonstrated by the program and college leadership as well as by faculty and staff that were engaged in preparing the SER. The committee is satisfied with the quality-driven culture of the BTP and commends the program on identifying weaknesses and challenges that have to be addressed.

#### **Recommendation:**

##### **Immediate (full implementation within one year)**

Establish a Quality Assessment committee, charged with the task of continuously assessing the extent and success in meeting objectives of the strategic plan.

**Signed by:**

Handwritten signature of Moshe Rosenberg in cursive script.

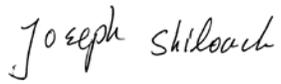
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Prof., Moshe Rosenberg,  
Chair

Handwritten signature of Gad Galili in cursive script.

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Prof. Gad Galili

Handwritten signature of Joseph Shiloach in cursive script.

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Prof. Joseph Shiloach

## Appendix 1: Copy of Letter of Appointment



May, 2012

שר החינוך  
Minister of Education  
وزير التربية والتعليم

Prof. Moshe Rosenberg  
Department of Food Science & Technology  
University of California, Davis  
USA

Dear Professor Rosenberg,

The State of Israel undertook an ambitious project when the Israeli Council for Higher Education (CHE) established a quality assessment and assurance system for Israeli higher education. Its stated goals are: to enhance and ensure the quality of academic studies; to provide the public with information regarding the quality of study programs in institutions of higher education throughout Israel; and to ensure the continued integration of the Israeli system of higher education in the international academic arena. Involvement of world-renowned academicians in this process is essential.

This most important initiative reaches out to scientists in the international arena in a national effort to meet the critical challenges that confront the Israeli higher educational system today. The formulation of international evaluation committees represents an opportunity to express our common sense of concern and to assess the current and future status of education in the 21<sup>st</sup> century and beyond. It also establishes a structure for an ongoing consultative process among scientists around the globe on common academic dilemmas and prospects.

I therefore deeply appreciate your willingness to join us in this crucial endeavor.

It is with great pleasure that I hereby appoint you to serve as Chair of the Council for Higher Education's Committee for the Evaluation of Biotechnology and Biotechnology Engineering Studies.

The composition of the Committee will be as follows: Prof. Moshe Rosenberg (Chair), Prof. Gad Galili, Prof. Milica Radisic, Prof. Joseph Shiloach.

Ms. Yael Elbocher will coordinate the Committee's activities.

In your capacity as Chair of the Evaluation Committee, you will be requested to function in accordance with the enclosed appendix.

I wish you much success in your role as Chair of this most important committee.

Sincerely,

Gideon Sa'ar  
Minister of Education,  
Chairperson, The Council for Higher Education

*Enclosures:* Appendix to the Appointment Letter of Evaluation Committees

cc: Ms. Michal Neumann, The Quality Assessment Division  
Ms. Yael Elbocher, Committee Coordinator

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כתובת אתר ממשל זמין: <http://gov.il>

כתובת אתר המשרד: <http://www.education.gov.il>

Appendix 2: Site Visit Schedule

**Biotechnology and Biotechnology Engineering –Schedule of site visit-  
Tel Hai Academic College**

**Thursday, March 15, 2012**

<b>Time</b>	<b>Subject</b>	<b>Participants</b>
10:45-11:15	Opening session with the heads of the institution and the senior staff member appointed to deal with quality assessment	The Vice-President for Academic Affairs: Professor Haim Goren, Dean of the Faculty of Sciences and Technology Professor Gidi Gross Director General: Mr. Yossi Malka The Student Registrar: Ms. Raaya Gal Dr. Gonen Sharon, a member of the quality assessment's team Mr. Ofer Baharal, the academic secretary
11:15 – 11:45	Meeting with head of Faculty of Sciences & Technology	Dean of the Faculty of Sciences and Technology Professor Gidi Gross
11:45-12:15	Meeting with the academic and administrative heads of the Department Biotechnology	Prof. Martin Goldway
12:15-13:00	Meeting with senior faculty and representatives of relevant committees (teaching/curriculum committee, admissions committee, appointment committee)	Prof. Gad Dgani, Prof. Vaya Jacob, Prof. Dani Bercovich, Prof. Hanoch Slor, Dr. Jamal Mahajna, Dr. Segula Mutsafy, Dr. Paula Belinky, Dr. Doron Goldberg, Dr. Solimam Khatib
13:00-13:45	Lunch – closed meeting + Meeting with Junior Faculty	In the same room Dr. Andrea Szuchman-Sapir Dr. Raffi Stern, Mr. Oren Pearlson , Mr. Yotam Gonen
13:45-14:15	Tour of West Campus: labs + library.	
14:15-15:15	Tour of Migal Research Institute (located in Kiryat Shemona, 5 km from the college).	
15:15-15:45	Tour of East Campus: classes, offices, Meeting Room.	
15:45-16:15	Meeting with Adjunct Faculty	Mr. Dani Gamrasani, Ms. Annat Zisovich, Mr. Amir Raz, Mr. Tom Kenig, Mr. Gefen Tal, Ms. Goldberg Tal, Mr. Reichmann Oren
16:15-17:00	Meeting with Bachelors students	Up to 8 students
17:00-17:45	Meeting with Masters Students	Up to 8 students
17:45-18:15	Closed door meeting of the committee	
18:15-18:45	Summation meeting with heads of the Faculty, institution & department	The Vice-President for Academic Affairs: Professor Haim Goren, Dean of the Faculty of Sciences and Technology Professor Gidi Gross Director General: Mr. Yossi Malka Mr. Ofer Baharal, Academic Secretary Prof. Martin Goldway, Heads of the Department

\* The heads of the institution and academic unit or their representatives will not attend these meetings

\*\* The visit will be conducted in English with the exception of students who may speak in Hebrew and anyone else who feels unable to converse in English.