**A Roadmap for Innovating Engineering Education in Israel**

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**ABSTRACT**

The whirlpool of globalization and the exponential rate of technological advancements have created a fluid reality where the *practice of engineering* demands constant change. Examining the *practice of engineering* reveals the inventory of required engineering skills. Over the past decade, European and American accreditation standards in engineering education (EUR-ACE\(^1\), ABET2000\(^2\)) have changed to accommodate the new demands of 21\(^{st}\) century society and provide a more appropriate answer to current trends and demands of modern industrial needs from the engineering profession, including criteria for the acquisition of multidisciplinary knowledge and skills [1] [2]. The ABET2000 and EUR-ACE accreditation criteria focus on student learning outcomes rather than teacher instructional inputs, in congruence to the Bologna Process\(^3\). This metamorphosis of the educational paradigm poses the academic responsibility of providing an engineering education that ensures that an engineering graduate learns how to become an engineer, encompassing the acquisition of both knowledge and skills of the practical as well as theoretical aspects of the engineering profession.

In contrast to many countries around the globe that have reformed and innovated their engineering programs according to the new international accreditation criteria (e.g. U.S.A, England, Finland, Denmark, Sweden, China, Vietnam, Japan, Australia etc.) Israeli academia has neglected to take the necessary measures to align their engineering programs to international accreditation standards and supply engineering graduates with the relevant skills and multidisciplinary knowledge that the flat world of the 21\(^{st}\) century requires. The principal role of Israeli engineering education has for decades been aligned with the obsolete approach that has been predominant since the 1950’s, that engineering education should be based on modern *engineering science* and disconnected from the *practice of engineering* [3]. Israeli engineering education has focused on, and directed its goals

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1 Framework for the accreditation of engineering degree programs in the European Higher Education Area (EHEA).

2 U.S. organization for the accreditation of college and university programs in applied science, computing, engineering, & technology.

3 A European reform process aimed at creating the European Higher Education Area.
towards the objective of transferring theoretical knowledge in the fields of applied science and engineering, and discarded the aspects of practical engineering from its curriculum almost entirely. The dichotomy between the theoretical science of engineering and the practical aspects of engineering, has led to the formation of a wide gap that still prevails in Israeli engineering education [4] between engineering education provided by universities and the prevailing realities and needs of Israeli and global hi-tech industries.

The colossal contribution of Israeli hi-tech industries to national economy (41% of the overall export income) [5] places heavy responsibility on educational policy makers and academic leaders in the field of engineering and technology, to ensure that academic programs train future engineers with the required knowledge and skills to design innovative products and systems that can successfully compete in a global intensely competitive economy.

This paper will present a roadmap to implement the innovation of engineering education in Israel on a national scale, in alignment with international accreditation standards and evaluation criteria, to strengthen undergraduate students engineering experiences and to better prepare them to be leaders in the design and development of Israeli and global technological innovation. We will examine a new international model for innovating engineering education (CDIO model) [3] and compare this model with existing models and international accreditation and evaluation criteria. We will further propose an action plan to form a national platform to research, design and implement innovation in engineering programs on a national scale in Israel.

References:

4 CDIO (Conceiving - Designing - Implementing – Operating) Initiative (www.cdio.org) – a new model for engineering education which offers an education stressing engineering fundamentals, set in the context of the Conceiving - Designing - Implementing - Operating process.