



UFABC stands for “Universidade Federal do ABC”, a young Brazilian Federal University in the ABC region, which is a 2.5-million people district outlying the Great São Paulo City. During the 20<sup>th</sup> century, it was in the ABC industrial belt that Brazil leveraged its thriving automobile industry. Legally created in 2005, UFABC started its activities in 2006 and is now celebrating five years of teaching. During this period, its name has been increasingly associated with innovation in higher learning, commitment to academic excellence with an interdisciplinary outlook and, last but not least, a firm belief in affirmative action as a means to play an effective role in society.

The interdisciplinary approach emerged in the 1970s and 1980s as the Cold War neared its end and the world enhanced its awareness of pressing social and environmental issues. The new issues were (are) much more complex than even the most formidable disciplinary challenges. However, they were neglected during most of the 20<sup>th</sup> century, when the disciplinary approach brought about new developments in science and technology at an unprecedented rate. The work effort aimed at such developments was much accelerated during the two World Wars and kept up by the risk of global conflict, ever since. However, after the collapse of the Soviet Union, the new threats that challenge the prevailing powers have changed their nature; thus, requiring a new approach to current conflicts and deadlocks.

During the 1950s and 1960s, the two competing powers committed themselves with some remarkable technological challenges, with the purpose of inspiring awe on all peoples of the world and gaining their “hearts and minds”. During the 1950s, the Soviets launched the Sputnik satellite, which was the first manmade object ever to orbit our planet. The first manned orbital flight happened in the early 1960s. It was then that Yuri Gagarin, the first astronaut, uttered his famous sentence “The Earth is blue”, a thoroughly new, but rather detached way of looking at the world. The Americans responded in the late 1960s by having an astronaut walk on the moon and bringing him back alive. Officially, all these events were motivated by scientific interest. However, they were also heavily covered by the media and followed by all peoples in a mediatic fashion. The underlying message was that if the big powers were able to achieve such amazing feats, they would also be able to solve the problems that afflict the lives of most men and women in the world, such as poverty, violence, environmental degradation, malnutrition, and so on.

Unfortunately, it is now clear that such expectations were mistaken, if not misguided. Most social and environmental issues cannot be successfully addressed from the perspective of only one discipline or disciplinary field, such as science and technology. Instead, the scientific perspective must join into the wider social, economic and environmental debate in the search for feasible and sustainable solutions in a democratic, educated decision-making framework. In order to do this, we need scientists with a new frame of mind, interacting with society in social organizations, in government, in academia, in the productive sector, in regulating agencies, and so on. These people should be ready to approach complex issues incorporating social, political, and technical requirements that may have to be negotiated to produce a feasible solution. UFABC is aware of this emerging need and is eager to address it.

At UFABC, undergraduate education starts necessarily with a three-year Interdisciplinary Bachelorship (IB). Two IBs are currently offered: Science and Technology, and Science and Humanities. Upon completion of the IB on Science and

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Technology, the student is entitled to a degree and may register in 1 of 17 courses leading to professional standing: eight two-year Engineering courses leading to Engineering degrees, or one-year B.S in Computer Science, or a B.S. and/or a license degree for high school teaching in Mathematics, Physics, Chemistry, or Biology.

The profile of “classical”, 20<sup>th</sup> century engineering education favored the definition of disciplinary specializations, such as Electrical, Mechanical, and Chemical Engineering. Given the interdisciplinary approach to general education through the sophomore level at UFABC, it was only natural to adopt an innovative engineering education profile, in which specializations are defined according to application domains, instead of scientific disciplines. Energy Engineering deals with a critical, but environmentally sensitive variable of the infrastructure underlying modern economies. Information Engineering focuses on how information is processed in the emerging Knowledge Society, an issue that is central to the productivity of modern organizations and to the new ways of organizing labor and cultural activities. Materials Engineering is crucial to produce new materials needed to support emerging functionalities in new devices, starting from the molecular level. Biomedical Engineering supplies more and more technology to the medical profession, thus helping it in improving the treatment of patients. Instrumentation, Automation and Robotics add more intelligence to the operation of systems, thus raising the efficiency of labor and machines. Aerospace Engineering supports the exploration of space for scientific purposes, as well as for monitoring the planet itself and providing communication capabilities. Management Engineering looks for effective ways for organizations to achieve their strategic objectives, in highly competitive environments. Finally, Urban and Environmental Engineering deals with the crucial problem of mediating the needs of urban development and environmental protection.

In order to encourage the shaping of interdisciplinary ventures and to avoid any kind of disciplinary entrenchment, UFABC is not organized in departments. Instead, the teaching staff is assigned to three large centers: the Center for Engineering, Modeling and Applied Social Sciences (CECS); the Center for Natural and Human Sciences (CCNH); and the Center for Mathematics, Computation and Cognition (CMCC). Notice that these Centers are not defined along disciplinary lines. Rather, they draw their identity from professional cultures and teaching responsibilities. This arrangement has already resulted in some very exciting interdisciplinary ventures. A remarkable one is the creation of new programs in the emerging area of human cognition, leading to B.S., M.Sc., and Ph.D. degrees. These programs will provide the first regular source of neuroscientists to the thriving São Paulo labor market. Also, in the pipeline, there are graduate and undergraduate programs in Planning and Management of Territories, which address the complex problem of managing the resources and spatial occupation of a territory impacted, for example, by the presence of a large metropolitan area.

Interdisciplinarity is not a new idea in Brazilian academic scene. Since the 1980s, leading Brazilian Universities have been establishing interdisciplinary special units to address timely issues. However, these initiatives were and still are peripheral to the hard core of the academic structure: the undergraduate courses, which remain essentially untouched for at least one half century. UFABC is the first Brazilian University to place interdisciplinarity at the center of its vision for the 21<sup>st</sup> century and to build a new institutional architecture to accommodate this vision. Of course, UFABC should be seen as an experiment, albeit an important one. In the coming years, it is vital that this experiment receives continued support while being followed up and critically evaluated. As of today, about 15 other Federal Universities are following suit and starting similar experiments.

On the other hand, disciplinary teaching and research must still go on, both for their own sake and to strengthen the disciplinary foundation of interdisciplinary learning. It is important that this be done in close correlation with industry, so that Brazil may overcome the current gap between scientific and industrial endeavors. In the ABC Region, and especially in its largest city (São Bernardo), the municipal authorities are keenly interested in the attraction of R&D initiatives by leading corporations in the area of air defense. UFABC may be a key component of this effort, not only by using its expertise in the search for new solutions for innovative industrial products, but also by using its interdisciplinary approach to address the defense issue as a whole, in its strategic, geopolitical, and technological dimensions.