Preface

The basic contents for many of the university courses were established in the 1960s. While these courses are still dynamic and lecturers continually add new materials to the curricula, for many of them the fundamentals have remained the same. However, when it came to teaching courses such as sensors, the situation was completely different. The advancement of the sensors field in the early 2000s, due to the emergence of new materials and devices, has been staggering. However, there was an absence of a clear reference text that could both provide the fundamentals of this multidisciplinary field and also stimulate student curiosity and imagination.

In 2006–2007, I coauthored a book entitled "Nanotechnology Enabled Sensors" (published by Springer). The book has many chapters that are exclusively about sensors but the focus of the text was on devices strongly influenced by nanotechnology. As a result, it was not a suitable reference book for a course only on sensors. In addition, the book still requires a comprehensive editorial revision. Consequently in 2009, I drew my attention to writing this book entitled "Sensors: An Introductory Course". The book still contains many sections borrowed from "Nanotechnology-Enabled Sensors"; however, the technical parts, which were previously focused on nanotechnology, have been removed and many pages on the basics of sensors and their operations have been added. The aim of this book is to provide an easy-to-understand and engaging text on sensors for university students, or those entering the field, with a large number of examples and well-designed illustrations.

The preparation of the materials for this book was a long, and at the same time, rewarding process. As the textbook subject was multidisciplinary, I needed to ensure a thorough understanding of students' background knowledge in the relevant disciplines. Consequently, I spent many hours researching materials presented to students from different disciplines and investigated learning resources about sensors from the point of view of biotechnologists, analytical chemists, physicists, medical doctors, and engineers. Visiting many laboratories and familiarizing myself with different analytical tools that are conventionally used in measurements and sensing were also important parts of this task. I carefully studied over 100 textbooks and 2,000 scientific papers to ensure the full gamut of devices, which are implemented in sensing systems, was included. In addition, I studied the literature

on pedagogy and also sat in many classes of relevant disciplines and engaged in discussions with the students of these disciplines in order to learn their point of view about educational engagement and learning. To ensure that the learning materials were relevant to the real-world experiences students would have in the field and were connected to what they would encounter and implement after their graduation, I visited numerous research and development firms, industrial factories, offices, and hospitals and identified the types of sensors that are commonly implemented in such places as well as the ways they are utilized and maintained.

The other important part of the editing process was started after the preparation of the first draft. At this stage, I actively sought feedback from students of chemistry, physics, biotechnology, and engineering to appreciate their point of view and ensure that the materials presented were easy to understand, regardless of the students' background knowledge, and would meet their learning needs. After this stage, the text was passed to approximately ten different academics, who provided the final comments that I meticulously incorporated into the final version of the book.

The text was designed in a way to encourage students to familiarize themselves with the real-world applications of sensors. All efforts were in place to assure that there was a clear connection between the student learning materials and what is happening within the wider research and industrial community in the field of sensors.

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http://www.springer.com/978-1-4614-5051-1

Sensors
An Introductory Course
Kalantar-zadeh, K.
2013, XII, 196 p., Hardcover
ISBN: 978-1-4614-5051-1