Statement of Teaching

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I think teaching is one of the noblest professions that can bring positive change in society. Research enables us to push the limits of knowledge farther and teaching helps us prepare minds for research. I have learned a lot from the teaching development courses organized by the Center for International Faculty and Leadership Development at both Menoufia and Alexandria Universities (2013 and 2016) and from my teachers of M.Sc. and Ph.D. courses that I studied in both Egypt-Japan University for Science and Technology and Keio University. In these courses, our teachers applied the concept of project-based learning in teaching. I have learned about different strategies to make class instruction more interesting and fun for students, in addition, to make use of technology for improving interaction among students and with the instructor outside the classroom.

1 Teaching Philosophy

My teaching philosophy is motivating students to pursue new knowledge and encouraging them to learn by themselves. A teacher's role in the learning process should be that of instilling into students the fundamentals of a subject and equipping them with the tools necessary to build on top of the fundamentals. Once students know the basic concepts and tools, a teacher should inspire them to go beyond the fundamentals and explore new worlds. This requires a teacher to develop independent thinking ability among students, which is so crucial for research.

Besides course subjects, I pay attention to training students the leadership, presentation skills, writing skills, and teamwork spirit. I contend that these capabilities will benefit the whole life of the students. As a teacher, it is important for me to make the students realize their duty to society or humanity in a broader sense.

2 Teaching Methodology

Well-designed curricula and good methodologies are keys to success in teaching. Normally, in the first lecture, I show the students the course topics and their importance for them and society. I enlighten the different skills the students will gain at the end of the course and how the next lecture will cover theses skills. Moreover, I normally have a detailed syllabus and up-to-date course information, which can be accessed online, that describe the scope and requirements of the course, Assessment policy, course project, provide tips for learning, include links to the fundamental materials that help build the foundation of the course, links to other reference materials for students that are keen to further explore the field. My courses generally balance fundamental materials and theory with state-of-the-art technologies. Projects are very important for stimulating the students' interest in a subject, helping them to better grasp the theories, and solving a practical problem in a team. The problem is divided into a set of smaller problems, and students are allowed to tackle some or all sub-problems. The students feel the project can help them to appreciate the teamwork experience. During the semester work, the students are required to submit a follow-up report to enable me to follow their progress and supervise them. At the end of the course, the students have to submit a technical report summering their works and contributions to the project. They also have to prepare and a presentation about the project.

Class attendance and discussion are important for the learning process. I make an effort to make my classes more interactive and interesting. I often raise questions when presenting materials related to what was taught earlier or before

presenting new material. This helps students to understand the relationship between different concepts and increases their interest in new material. In order to draw less active students into class discussions, I intervene as little as possible and mostly encourage students to freely express their ideas and correct each other's mistakes. In addition, I make a short-time assignment during the lecture to assure on some important concepts. I also ask students to turn in questions and criticism on the class presentation materials after each class. I also provide chapter quizzes to help students to digest course materials and motivate their class participation.

Different methodologies are needed for undergraduate classes and graduate classes. For undergraduate courses, instead of lecturing throughout the class, I often ask the students to volunteer to solve the problems on the whiteboard based on the concepts I have presented. I would ask the class students to check the solutions. This exercise is for several purposes: attracting the students to focus their attention on the class lecturing, helping the students to grasp the basic concepts in-depth, stimulating their interests in a subject, and training the students to have the self-confidence and apply their knowledge to solving the problems quickly.

For a graduate course, I have taken many classes and I would like to implement the following approach in my classes. I pay attention to train the students to grasp the basic skills. Besides course materials, I also give out articles on how to read, write, and present research papers, as well as sample slides from previous students. After a student presentation, the students and I discuss what to learn from a speaker, and what to avoid. To help students to improve their writing, I often allow students to modify and re-submit their term reports multiple times. During this process, I try to get them to better organize their ideas into the format of a technical report and present their ideas clearly. Besides providing various reference books and detailed lecture notes on fundamental techniques, I also use, as of course materials, the articles appearing in top technical conferences and journals as well as popular magazines.

Besides normal office hours, I make appointments with students who could not make office hours or need urgent guidance, and exchange emails with them responsively. I also hand out mid-semester evaluation forms to get feedback about the course so that I can improve the course to meet student needs.

3 Teaching Experience

My first experience of teaching in a formal setting was during my early graduate years. I taught prepared laboratory sessions and gave tutorials as a Teaching Assistant at the Department of Industrial Electronics and Control Engineering, Faculty of Electronic Engineering, Menoufia University, Egypt, in the period from 2009 to 2011. I taught around 32 hours per weak for the following courses: Nonlinear Control Systems, Electric Circuits Engineering, Training Course in Electronics, Analog Circuits, Programmable Logic Control, Process Control Engineering, Mathematics Engineering, and Microcontrollers and its applications.

In 2015, I participated in the Egypt-Japan Workshop on Practical Education for Mechatronics and Robotics that was held at Egypt-Japan University for Science and Technology and organized by Egypt-Japan University for Science and Technology and Waseda University. As an assistant lecturer, I taught prepared laboratory sessions and gave tutorials at a number of 3 days workshop on Unmanned Aerial Vehicles (UAVs).

After receiving my Ph.D. degree, I have been recruited as a full Assistant Professor at the Department of Industrial Electronics and Control Engineering, Faculty of Electronic Engineering, Menoufia University, Egypt. I got the opportunity of contributing to and developing the course content, preparing and giving lectures, homework, exams, and programming assignments for the following two courses:

- ACE 225 − Microcontrollers: This is an undergraduate core course that introduces basic hardware and programming of Microcontrollers. In Spring 2017, I taught this course for a group of 250 students. Topics covered include Communication Modules, Analog to Digital Conversion, Interrupts, Timers, and Pulse Width Modulation. This course intends to help the Electronic Engineering students to improve their skills in embedded systems hardware and software.

- ACE 182 − Machines Theory: This is an undergraduate course for the students of the Mechatronics discipline which introduces basics of analysis and synthesis of mechanisms. In Spring 2017, I taught this course for a group

of 5 students. Topics covered include Kinematics Fundamentals, Graphical Linkage Synthesis, Position, Velocity and Acceleration Analysis, Dynamics Fundamentals, Dynamic Force Analysis, and Static Balancing. I introduce MSC ADMAS software for kinematics and dynamics analysis and software specified for mechanism synthesis verification.

As an Adjunct Lecturer, I joined the Department of Production Engineering and Automatic Control, French University in Egypt. I taught, prepared, and gave lectures, homework, and exams for the following course:

- Signal Conditioning: In Fall 2016, I taught this course for a group of 7 students. The main aim of the course is to get basic theoretical and practical skills for the design of the interface circuits for processing signals from/to sensors/actuators and for the treatment of the data from the digital and smart sensors. Get a practical experience with software for theoretical design and simulation of these circuits, and hardware and software resources for processing and digitization of analog signals from sensors. I have introduced software for design and simulation of complex conditioning circuits.

In Spring 2017, I have been recruited as Adjunct Lecturer at the Department of Aerospace and Communications Engineering, University of Science and Technology, Zewail City for Science and Technology, to teach the following course

- SPC 318 − System Modeling & Linear Systems: This is an undergraduate core course that introduces basics of modeling and control of systems. In Spring 2017, I taught this course for a group of 60 students. System modeling and control are integral parts of all aerospace applications, from aircraft and spacecraft to robots and process control systems. Learning how to linearize and construct mathematical models for dynamical systems will help you qualitatively and quantitatively evaluate the behavior of the proposed system, and optimize system performance. The design and implementation of a simple control algorithm will help you to achieve the target performance of the system to be controlled. The students in this course are evaluated based on exams, quiz, and project idea, simulation, real-time implementation, reports, and presentation.

4 Student Supervision

Apart from teaching, I also supervise research projects for undergraduate students. I have tried to arrange the projects to meet the students' interests and their knowledge level and work with them closely. Already, students have produced some interesting ideas during classroom discussions and project work, some of which have resulted in technical papers in the field of robotics and automation.

For supervising graduate students, I would like to implement the following methodology that I gained from my research experience during my Ph.D. and post-doc periods. It is very important for a graduate student to be able to work independently, and being able to identify the research problem. Instead of simply assigning a problem and forcing the students to work on the topics I choose, I try to find the best way for each student to enter the research field based on her background and interest. For students that have difficulty starting their work, I pick some sample papers to study with them, showing them how to identify and attack the problems. I also do not modify a student's paper directly. Instead, we discuss where and how to make changes and generally, go through several iterations. Even though this may be a slower approach, I believe this training process is worthwhile, particularly in terms of training their capabilities in pursuing high-quality research.