CV and LIST of PUBLICATIONS

Ataturk University College of Engineering
Department of E&E Engineering
Head of the Department
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Name-Surname: KÖKSAL ERENTÜRK

Date of Birth: April 23rd, 1973

Current Status: Professor (***Head of the Department and Chair of the High Voltage and Power Division***)

Education:

Degree	Department	University	Year
Undergrad	Electronics&Telecom. Engineering (***Honour***)	Yıldız Technical University	1994
M.Sc.	Electronics Engineering	Istanbul University	1997
Ph.D.	Electrical Engineering	**State University of New York** *collaborated and integrated with* Karadeniz Technical University	2002
Reseacher (Scholarship from TUBITAK)	Electrical Engineering	State University of New York at Binghamton - USA	2002-2003
Reseacher (Scholarship from Ataturk University)	Electrical Engineering	The Ohio State University - USA	2003-2004
Visiting Professor	Electrical Engineering	University of Manitoba - CANADA	2015
Visiting Professor	Electrical Engineering	Kuwait College of Sci.&Technology	2016

Teaching experiences in chronological order:

Positions Held	Department	Institute/University	Year
Prof. Dr.	Electrical&Electronics Eng.	Ataturk University	2014-
Prof. Dr.	Electrical&Electronics Eng.	Piri Reis University	2013-2014
Associate Prof. Dr.	Electrical&Electronics Eng.	Bahçeşehir University and Ataturk University	2009-2013
Assistant Prof. Dr.	Electrical&Electronics Eng.	Ataturk University	2004-2009
Research Associate	Electrical&Electronics Eng.	Ataturk University	2002-2004
Research Assistant	Electrical Eng.	Karadeniz Tech. University	1997-2002
Research Assistant	Electronics Eng.	Istanbul University	1995-1997
Research Assistant	Electrical&Electronics Eng.	Ataturk University	1994-1995

Program Manager of ABET

Executive Manager and Advisor "Design and Implementation of Multi-Level Inverter Based 100 MW Back-to Back HVDC System", THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY – TUBITAK, ***SUCCESFULLY COMPLETED***. (Budget: ***35.000.000 USD***)

Program Manager of Configuration and Installation of Infrastructures of Smart Grid & Green Energy Institute

Memberships :

IEEE
IEEE Ind. Electronics Society
IEEE Power Electronics Society
IEEE Power&Energy Society

Editor/Referee: (Selected)

*TURKISH JOURNAL OF ELECTRICAL ENGINEERING & COMPUTER SCIENCES (***Editor***)*

*AMERICAN JOURNAL OF ENERGY AND POWER ENGINEERING (***Editor***)*

*INT. JOURNAL OF ELECTRICAL COMPONENTS&ENERGY CONVERSION (***Editor***)*

*INT. JOURNAL OF SYSTEMS SCIENCE&APPLIED MATHEMATICS (***Editor***)*

IEEE INDUSTRIAL ELECTRONICS (**Referee**)

IEEE INDUSTRIAL INFORMATICS (**Referee**)

IEEE/ASME TRANSACTIONS ON MECHATRONICS (**Referee**)

IET ELECTRIC POWER APPLICATIONS (**Referee**)

IET GENERATION, TRANSMISSION & DISTRIBUTION (**Referee**)

IET POWER ELECTRONICS (**Referee**)

IET CONTROL THEORY AND APPLICATIONS (**Referee**)

ROBOTICA (**Referee**)

PUBLICATIONS

A. International journal articles (SCI-SCI Exp.):

A1. Erenturk, K., Altas, I.H., "Fault Identification in a Radial Power System Using Fuzzy Logic", ***INSTRUMENTATION SCINCE AND TECHNOLOGY***, **32 (6)**, 641–653 (2004).

A2. Erenturk, K., Erenturk, S., Tabil, L. G., "A Comparative Study For The Estimation of Dynamical Drying Behavior of Echinacea Angustifolia: Regression Analysis And Neural Network", ***COMPUTERS AND ELECTRONICS IN AGRICULTURE***, **45**, 71-90 (2004).

A3. Erenturk, K., "Application of Fuzzy Logic to a Leakage Current Relay", ***IRANIAN JOURNAL OF SCIENCE & TECHNOLOGY – TRANSACTION A***, **29 (A2)**, 305-317 (2005).

A4. Erenturk, K., "A New Digital Protective Relay Based On Fuzzy Logic and Value Estimation", ***IRANIAN JOURNAL OF SCIENCE & TECHNOLOGY – TRANSACTION A***, **29 (A2)**, 267-276 (2005).

A5. Erenturk, K., "MATLAB-based GUIs for fuzzy logic controller design and applications to PMDC motor and AVR control", ***COMPUTER APPLICATIONS IN ENGINEERING EDUCATION***, **13 (1)**, 10-25 (2005).

A6. Gundogdu, O., Erenturk, K., "Fuzzy Control of a DC Motor Driven Four-Bar Mechanism", ***MECHATRONICS***, **15**, 423–438 (2005).

A7. Erenturk, S., Erenturk, K., "Comparison of genetic algorithm and neural network approaches for the drying process of carrot", ***JOURNAL OF FOOD ENGINEERING***, **78 (3)**, 905-912 (2007).

A8. Erenturk, K., "Hybrid Control of a Mechatronic System: Fuzzy Logic and Grey System Modeling Approach", ***IEEE/ASME TRANSACTIONS ON MECHATRONICS***, **12 (6)**, 703-710 (2007).

A9. Erenturk, K., "Nonlinear two-mass system control with sliding-mode and optimised proportional-integral derivative controller combined with a grey estimator", ***IET CONTROL THEORY AND APPLICATIONS***, **2 (7)**, 635-642 (2008).

A10. Erenturk, K., "Dynamic Characterization of a UV Fluorescent Lamp", ***IEEE TRANSACTIONS ON PLASMA SCIENCE***, **36 (2)**, 519-523 (2008).

A11. Erenturk K, "ANFIS-Based Compensation Algorithm for Current-Transformer Saturation Effects", ***IEEE TRANSACTIONS ON POWER DELIVERY***, **24 (1)**, 195-201 (2009).

A12. Erenturk K, "Adaptive-Network-Based Fuzzy Inference System Application to Estimate the Flashover Voltage on Insulator", ***INSTRUMENTATION SCIENCE & TECHNOLOGY***, **37 (4)**, 446-461 (2009).

A13. Erenturk K, "Gray-fuzzy control of a nonlinear two-mass system", ***JOURNAL OF THE FRANKLIN INSTITUTE-ENGINEERING AND APPLIED MATHEMATICS***, **347 (7)**, 1171-1185 (2010).

A14. Kaleli, A., Dumlu, A., Corapsiz, M. F., Erenturk, K., "Detailed Analysis of SCARA-Type Serial Manipulator on a Moving Base with LabView", ***INTERNATIONAL JOURNAL OF ADVANCED ROBOTIC SYSTEMS***, **10**, (2013).

A15. Erenturk K, "Fractional-Order $PI^{\mu}D^{\lambda}$ and Active Disturbance Rejection Control of Nonlinear Two-Mass Drive System", ***IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS***, **60 (9)**, 3806-3813 (2013).

A16. Erenturk, S., Erenturk, K., "A novel extrapolation method for value prediction applications", ***SCIENTIFIC RESEARCH AND ESSAYS***, **8 (4)**, 197-201 (2013).

A17. Dumlu, A., Erenturk, K., "Trajectory Tracking Control for a 3-DOF Parallel Manipulator Using Fractional Order $PI^{\mu}D^{\lambda}$ Control", ***IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS***, **61 (7)**, 3417-3426 (2014).

A18. Dumlu, A., Erenturk, K., "Modeling and Trajectory Tracking Control of 6-DOF RSS Type Parallel Manipulator", ***ROBOTICA***, **32 (4)**, 643-657 (2014).

A19. Tohidi, H., Erenturk, K., "Robust Adaptive Fault-Tolerant Tracking Control of Three-Phase Induction Motor", ***ADVANCES IN ELECTRICAL ENGINEERING,*** **2014**, 1-7 (2014).

A20. Kaleli, A., Ceviz, M.A., Erenturk, K., "Controlling spark timing for consecutive cycles to reduce the cyclic variations of SI engines", ***APPLIED THERMAL ENGINEERING***, **87**, 624-632 (2015).

A21. Corapsiz, M.F., Erenturk, K., "Trajectory Tracking Control and Contouring Performance of Three Dimensional CNC", ***IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS***, **63 (4)**, 2212-2220 (2016).

A22. Dumlu, A., Erenturk, K., Kaleli, A., Ayten K.K., "A Comparative Study of Two Model-Based Control Techniques For The Industrial Manipulator", ***ROBOTICA***, DOI: http://dx.doi.org/10.1017/S0263574716000709

B. International Confererences and *Proceedings (Selected)*:

B1. Erenturk, S., Erenturk, K., "Genetic Algorithms and ANFIS for Food Drying", *Proceedings of the International XII. Turkish Symposium on Artificial Intelligence and Neural Networks-TAINN 2003*, Çanakkale-Turkey, 183-186, July 2003.

B2. Erentürk, K., Erentürk, S., "Application of a Neural Network to Estimate Dynamical Drying Behavior of Rosehip", *1st International Rosehip Conference*, 61, Gümüşhane, 7-10 Eylül 2004.

B3. Erenturk, K., "Dynamic Control Of Pwm Buck-Boost Converter: Applications Of Fuzzy Logic And Sliding Mode Control", *TPE-2006*, Ankara, 925-930, Mayıs 2006.

B4. Dumlu, A., Erenturk, K., "Design, Analysis and Real-Time Forward Kinematics of a Cable Based Parallel Manipulator", International Conference on Electronics, Computer and Computation – ICECCO, Ankara, 2012.

B5. Gundogdu, O., Aydin, M. R., Balci, M., Erenturk, K., "Using Simulink As An Active Learning Aid In Dynamics/Vibrations Courses", International Conference on Engineering Education 2013, Madinah, Kingdom of Saudi Arabia, December 2013.

B6. Tohidi, H., Erenturk, K., "Robust Adaptive Fault Tolerant Controller Design, Applied to Three Phase Induction Motor", PEMC 2014, Antalya, Turkey, 2014.

B7. Erenturk, K., "Modeling of Dynamical Industrial Systems Using Fractional Order Calculus", ICONSETE 2015, Vienna, Austria, August 25-28 2015.

B8. Erenturk, K., "Fractional Order Controller Design and Applications", ICONSETE 2015, Vienna, Austria, August 25-28 2015.

B9. Kaleli, A., Ceviz, M.A., Erenturk, K., "Self Tuning Controller for Reducing Cycle to Cycle Variations in SI Engine", International Conference on Sustainable Energy and Environmental Engineering (SEEE 2015), Bangkok, Thailand, October 25-26, 2015.

B10. Kaleli, A., Ceviz, M.A., Erenturk, K., "Minimum Variance Spark Timing Controller for Reducing Cycle to Cycle Variations in SI Engine", The First International Symposium on Sustainable Aviation (ISSA), Istanbul, Turkey, 31 May-3 June, 2015.

B11. Dumlu, A., Erenturk, K., "Design and linear quadratic optimal regulator (LQR)control of 6-dof RSS parallel manipulator", 2015 International Conference on Applied Mechanics and Mechatronics Engineering (AMME2015), Bangkok, Thailand, October 25-26, 2015.

B12. Erenturk, K., "Application of Electric Springs in Smart Grids", 2nd International Conference on Science, Ecology and Technology (ICONSETE'2016), Barcelona, Spain, October 14-16, 2016.

B13. Erenturk, K., "Fractional Order Modeling and Control of Smart Grid Connected Photovoltaic (PV) Energy Generation System", 2nd International Conference on Science, Ecology and Technology (ICONSETE'2016), Barcelona, Spain, October 14-16, 2016.

B14. Erenturk, K., Erenturk, S., "Modeling of Drying Process Using Fractional Order Calculus", 1st International Mediterranean Science and Engineering Congress (IMSEC 2016), Çukurova University Congress Center, Adana – TURKEY, October 26-28, 2016.

B15. Erenturk K., "Smart Energy-Systems for Large-Scale Integration of Renewable Electrical Energy", Karlstad-SWEDEN, April 2016.

C. <u>National journal articles (EI) *(Selected)*</u>:

C1. Erenturk, K., Altas, İ. H., "Fuzzy logic based automatic voltage regulator", *Engineering Sciences Journal of Niğde University*, **5 (1)**, 43-49 (2002).

C2. Erenturk, K., Altas, İ. H., "Fuzzy logic based digital protective relay: Design and implementation", *Pamukkale University Journal of Engineering Sciences*, **8 (1)**, 67-73 (2002).

D. <u>National Confererences and *Proceedings (Selected)*</u>:

D1. Erentürk, K., Altaş, İ. H. "Artificial Neural Networks based automatic voltage regulator and its digital simulation", *Automatic Control National Assembly Meeting*, 311-315, Ankara, 2002.

D2. Cansız, A., Erentürk, K., "Using super-conductors as energy storage unit in passive stabiliaation", *Electrical-Electronics Engineering 10th Annual Meeting*, 240-242, İstanbul, September 18-21, 2003.

D3. Erentürk, K. "Investigation of effect of different type fuzzy logic based controllers on PMDC motor control", *Automatic Control National Assembly Meeting*, 50-55, Ankara, 2006.

D4. Dumlu, A., Erenturk, K., "Design of Cable based Parallel Manipulator and Solution of Forward Kinematic using Sylvester Elimination Method", *Symposium on Electrical-Electronics&Computer Engineering*, Elazığ, 2011.

D5. Dumlu, A., Kaleli, A., Erenturk, K., "Kinematic and Dynamic Behavior Analysis of Moving Base Placed MSRP Serial Manipulator", *Automatic Control National Assembly Meeting*, 166-170, Niğde, 2012.

D6. Dumlu, A., Gündoğdu, Ö., Erenturk, K., "Computed Torque Control of a DC Motor Driven Foru-Bar Mechanism", 16th National Symposium on Theory of Machines, Atatürk University Engineering Faculty, Erzurum, 12-13 September 2013.

D7. Corapsiz, M. F., Erentürk, K., "Trajectory Tracking and Contour Control of a Portal Type 3-Axes CNC Machine", ELECO' 2014, Bursa, 2014.

D8. Corapsiz, M. F., Erentürk, K., "Design and Implementation of a Portal Type 3-Axes CNC Machine", ELECO' 2014, Bursa, 2014.

D9. Kaleli, A., Ceviz, M.A., Erentürk, K., "IGNITION Angle Control System Design For Reducing Cyclic Variability In Spark Ignition Engines", Automatic Control National Assembly Meeting, 321-326, Kocaeli, 2014.

D10. Güner, E., Ceviz, M.A., Kaleli, A., Öner, İ.V., Erentürk, K., "LPG-Fuel Temperature Control In Spark-Ignition Engines", Automatic Control National Assembly Meeting, 345-349, Kocaeli, 2014.

D11. Dumlu, A., Erenturk, K., "Design and Control of Stewart Platform 6-DOF RSS Kinematic Chain Architecture", Automatic Control National Assembly Meeting, 447-453, Kocaeli, 2014.

E. LECTURES:

E1. "Electromagnetic Wave Theory", Ataturk University-Erzurum/TURKEY – ENGLISH (*Undergraduate*)

E2. "Electrical Power Generation, Transmission and Distribution", Ataturk University-Erzurum/TURKEY – ENGLISH/TURKISH (*Undergraduate*)

E3. "Electrical Machines", Ataturk University-Erzurum/TURKEY –TURKISH (*Undergraduate*)

E4. "Electromechanical Energy Conversion", Ataturk University-Erzurum/TURKEY – TURKISH (*Undergraduate*)

E5. "Power System Analysis", Ataturk University-Erzurum/TURKEY –TURKISH (*Undergraduate*)

E6. "PLCs: Programmable Logic Controllers", Ataturk University-Erzurum/TURKEY – ENGLISH (*Undergraduate*)

E7. "Fuzzy Control and Modeling", Ataturk University-Erzurum/TURKEY – ENGLISH (*Graduate*)

E8. "Power System Protection", Ataturk University-Erzurum/TURKEY – TURKISH (*Graduate*)

E9. "Dynamics of Electrical Machines", Ataturk University-Erzurum/TURKEY – ENGLISH/TURKISH (*Graduate*)

F. BOOKS-LECTURE NOTES:

F1. "Lecture Notes on Electromechanical Energy Conversion" – In Turkish, Ataturk University/Erzurum-TURKEY.

F2. "Lecture Notes – Introduction to Electrical Machines" – In Turkish, Ataturk University/Erzurum-TURKEY.

F3. "Electrical Machines Labs. – Laboratory Experimental sheets" – In Turkish, Ataturk University/Erzurum-TURKEY.

F4. "Lecture Notes – Dynamics of Electrical Machines" – In English, Ataturk University/Erzurum-TURKEY.

F5. "Lecture Notes – High Voltage Engineering & Energy Generation, Transmission and Distribution" – In English, Ataturk University/Erzurum-TURKEY.

F6. "Lecture Notes – Power System Protection: Analog and Computer based Approaches" – In English, Ataturk University/Erzurum-TURKEY.

F7. "Lecture Notes – PLCs: Programmable Logic Controllers" – In English, Ataturk University/Erzurum-TURKEY.

G. PROJECTS:

G1. "Electronic Target for Armed Shooting Training", TURKISH ARMED FORCES, **Project Manager**, March 2003. (Budget: 45.000 USD)

G2. "Electrical Characterization of Chemical and Agricultural Products", SCIENTIFIC RESEARCH PROJECT in ATATURK UNIVERSITY, BAP-2006/129, **Project Manager**, January 2008. (Budget: 15.000 USD)

G3. "Improvement of Efficiency on Synchronous and Asynchronous Machines in Industrial Applications", SCIENTIFIC RESEARCH PROJECT in ATATURK UNIVERSITY, BAP-2003/258, **Project Manager**, January 2007. (Budget: 85.000 USD)

G4. "Investigation of Variable Length of Intake Manifold Plenum Effects on Motor Performance", THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY – TUBITAK, **Researcher,** TUBITAK 107M018, November 2009. (Budget: 155.000 USD)

G5. "Faulty Product Shelling Machine", THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY – TUBITAK, **Advisor,** TUBITAK 3080015, November 2008. (Budget: 120.000 USD)

G6. "Design and Manufacturing of New Generation Illuminating System", MINISTRY OF SCIENCE, INDUSTRY AND TECHNOLOGY, **Project Manager and Advisor**, January 2010. (Budget: 755.000 USD)

G7. "Design and Precision Control of an Electric Vehicle with Flexible Parallel Mechanism", SCIENTIFIC RESEARCH PROJECT in ATATURK UNIVERSITY, BAP-2011/416, **Project Manager**, July 2013. (Budget: 25.000 USD)

G8. "Design and Precision Control of a Gantry Robot for Transportation Systems", SCIENTIFIC RESEARCH PROJECT in ATATURK UNIVERSITY, BAP-2011/369, **Project Manager**, July 2013. (Budget: 22.000 USD)

G9. "Synchronized Control of Robotics and Mechatronics Systems for Optimum Trajectory Tracking", THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY – TUBITAK, **Researcher**, TUBITAK 113E320, Start: September 2013 – Cont.. (Budget: 30.000 USD)

THESIS SUPERVISED (Ph.D.):

Ahmet Dumlu, "Modeling and Trajectory Tracking Control of 6-DOF RSS Type Parallel Manipulator".

Fatih Çorapsız, "Dynamic Modeling and Control of a Gantry Robot".

Alirıza Kaleli, "Performance and Efficiency Improvement of Internal Combustion Engines".

Hossein Tohidi, "Robust Adaptive Fault Tolerant Controller Design, Applied to Three Phase Induction Motor".

PROFESSIONAL EXPERIENCE

INAN Electricity Company, *Project Manager& Advisor*, Erzurum&Ankara, 1997-2002.

- Overhead high-power transmission cable network system, between Erzurum and Agri (~400 km), has been constructed.
- A transformer maintenance and repair station has been constituted in Erzurum.
- Company continues its business activities in Ankara.

SES Robotics, *Project Manager*, Istanbul, 2002-2010

- Surgical robotics systems have designed and employed in most of new generation hospitals,
- It was a sustainable project offered to TUBITAK,

- Most of the designed systems were remote-access systems.

IMAJ Machine&Electromechanical Systems Corporation, *General Manager*, Erzurum, 2010-Present

- Gantry crane type container handling systems are producing,
- Marble industry is the main market,
- Additionally, CNC router systems are also producing and selling.

Cemiloglu Robotics&Mech. Limited Company, *Vice-President&Technical Director*, Erzurum, 2013-Present

- Flight simulator is the heart of the company,
- **3D printer design and manufacturing (HAMARAD®)**
- Some important commercial contracts have been signed,
- University&Industry collaboration has been estabilished.

Marital Status: Married

Number of children: 3

EDUCATIONAL PHILOSOPHY

My Personal Educational Philosophy is to "***empower the minds that will find global solutions to tomorrow's challenges by fostering academic and professional expertise and excellence in leadership***". Additionally, My Personal Educational Philosophy is also based on "**Existentialism**" and I consider myself both an existentialist and an experimentalist. According to me, I think they complement each other. I believe that personal growth and individual development will lead to "***new ways to expand and improve society***".

As well-known, the teacher in existentialist education is there to provide pathways for students to explore their own values, meanings, and choices. In order to do this, learners need to be aware of as many options and choices as possible; they need to feel empowered and free to determine their own values and identities; and they need a multiplicity of experiences to enhance their self-awareness. The teacher's primary responsibility is to provide all these things, and to maintain a learning environment where students feel encouraged to express themselves through discussion, creative projects, and choice of study areas.

The role of the student is to determine their own values and identity. Existentialist education recognizes the role of both culture and individual nature in identity formation. The existentialist student maintains a dialogue between the self and cultural values: considering the self in cultural context, and considering cultural values in relation to the self.

Freedom, choice, and responsibility form a complex interrelation in existentialist philosophy. The student is free to form and pursue their own values, but that freedom comes includes taking full responsibility for those values. The existentialist student accepts responsibility for their own values, feelings, and actions, because these have been self-generated rather than dictated by an authority.

Based on the aforementioned reasons, I use the following teaching techniques such as: ***collaborative learning***, ***problem-based learning***, ***project-oriented learning***, ***case method***, ***service-learning***, and ***research-based learning***.

I established four different types of classroom in our E&E department which promote a new educational experience: "***Aziziye***" classrooms, with swivel chairs to promote collaborative work: "***Yakutiye***" classrooms, with tables which become spaces for interactive work; "***Mecidiye***" classrooms which promote real-time experimentation; and "***ACE***" classrooms, with multiple projection and collaborative tables. These four classrooms mean that groups actively participate in each one of the courses.

For this reason, I support an innovative educational model that adapts to the world we live in and the specific characteristics of digital natives: young people in the 21st Century. It is based on three major pillars:

- Learning experiences challenging and interactive
- Flexibility in the teaching-learning process
- Inspiring Teachers

The main objective of this effort is to evolve the educational model to enhance the skills of present generations and improve the competitiveness of students in their field, and thus develop the required skills that enable them to become leaders take on the challenges and opportunities.

My Philosophy of Teaching

I think that the goal of *educating* university-level students can only be achieved by presenting them with more than lectures, rote memorization tasks, and straightforward projects (i.e., traditional schooling). In other words, an educator must move beyond the traditional model of schooling to a point at which students can learn effectively.

When students come into university courses they are but a few steps away from their professional careers. How can we prepare students to succeed in this competitive environment? The answer is to move them out of their comfort zone by presenting them with realistic problems that have undefined boundaries and solutions and that require cooperation as well as competition. The goal of this is to help students to learn to be critical thinkers and effective problem solvers so that they can be effective competitors in their careers.

To achieve the goal of helping students learn, an educator must have a teaching strategy that guides the delivery of the course content and specific tactics that can be used to achieve success.

I believe that one of the most important ways for me to provide high quality teaching is to be prepared for each and every class period. Therefore, I always strive to be prepared by knowing the material, having visuals prepared, and ordering the class in a logical and consistent manner.

A corollary to preparation is the need to know the subject matter. To present course content adequately, it is critical to know what I am talking about.

A second corollary to preparation is to know my students. When I say that I need to know my students, I not only mean that I need to learn their names so as to personalize my relationship with them. To share knowledge

that is pertinent to students, I must know their needs, expectations, and career goals.

I think that an educator should treat each student as an individual. This comes from my recognition that the original role for educators was as a mentor.

The classroom should not be a venue for one-way communication. An important part of the learning process is expressing individual opinions and receiving feedback about these opinions. Therefore I use a number of approaches to encourage individual students to participate. For example, I generally require that students in my courses earn participation credit via activities both inside and outside of the class. Further, in all of the classes that I teach I frequently call on individual students to answer questions or respond to my inquiries. Finally, in project-based courses involving difficult concepts I generally ask students to work on in-class cases and exercises. I have found that practical examples help students to better understand complex concepts because each student will need to actively focus his or her thinking on the concept rather than passively listening to a lecture.

I strive to deliver a quality product to students. Quality is a critical part of effective teaching. To maintain high quality standards, an educator must define realistic objectives, reexamine course content to make sure the objectives are being met, and implement positive changes that will maintain and improve quality service to students, colleagues, and the university.

I think that to properly educate students at the university level, an educator must make the material he or she is teaching pertinent to students. Often this means that material should be taught in such a way that each student is able to relate to the material and apply it to his or her life and career. This can frequently be accomplished by providing real world examples and cases that demonstrate the concepts that are being taught. One very useful tool to accomplish this goal is the Internet because it can be used to show

students web sites that illustrate in more concrete ways the concepts being discussed in class.

I utilize technology in presentations, in contacting and tracking students, and in disseminating information and course materials. For example, I often utilize PowerPoint, the Internet, and software packages that are being discussed in the classroom in order to make presentations or convey ideas to students. In addition, I extensively use tools like e-mail to keep in contact with students and, in effect, create a virtual classroom environment. I make extensive use of the web to disseminate to students course materials like assignments and the syllabi.

I believe that the best way for a student to develop a good understanding of a topic is to create opportunities for him or her to act rather than to merely read a book or listen to a lecture. To do this, I incorporate numerous hands-on activities in the classes that I teach. This type of exercise is very practical and helps students to understand important concepts related to the course.

To provide a quality teaching environment, an educator should be willing to change the way that he or she teaches. I am open to change and constantly try to reevaluate the courses that I teach with the goal of improving the teaching environment. I often vary the mode of presentation by using, for example, the whiteboard on one day, PowerPoint the next day, and hands-on lab instruction on the third day.

I think that it is critical that students be expected to act responsibly, to learn to be professional, and to meet high standards in the classroom. At the same time, it is also important to be fair and evenhanded with all students. To achieve these goals I require that students adhere to deadlines, that they produce quality work, and that they act professionally in their interactions with one another and with me. To make sure that all students have the same opportunity to achieve these goals I always attempt

to make my expectations about required performance clear both in written as well as verbal instructions. In addition, however, I also attempt to be fair to all of my students by being impartial in grading and interacting with students and by treating individuals with respect.

I think that the research that an educator is involved in is very relevant to teaching. In my experience, every manuscript that I have published has been relevant to my classes in one manner or another. Thus, scholarship and teaching are closely intertwined and are critical to successful teaching.

I think that the best way to learn is to make the topic enjoyable and to create an environment in which students can have a good time while they learn. I therefore try to inject not only humor into lectures and discussions but also make projects fun and enjoyable. In addition, I try to express to my students the fact that I think that the topics that I teach are not only interesting and important, but also that they are usually fun to learn. One of the best ways to do this is to maintain a high level of excitement about the topic and express that excitement to students. In this way I hope to spark the flame of excitement from learning in their minds as well.

RESEARCH VISION STATEMENT

KOKSAL ERENTURK

erenturk@yahoo.com or keren@atauni.edu.tr

My research interests primarily lie in the fields of "*Smart Energy-Systems for Large-Scale Integration Of Renewable Electrical Energy*", "*Hybrid Energy Storage System and Its Control*", "*Optimizing of PMU Placement Location*", optimal flow controls, load balancing, fault-tolerant systems, and circuit and systems. The goal of my research is to develop a challenge of integrating fluctuating renewable energy power sources such as wind, solar and ocean energy that radically improve the performance of those network systems by sharing their inputs. "Cyber-security and Control of the electrical power systems" and "State estimation with respect to the advancements of the smart grid" are at the heart of my research agenda idea.

1 RESEARCH BACKGROUND

I have succsefully managed and finished more than 10 national and 2 international projects based on quite different industrial research areas and broad areas of sciences such as: smart grid, renewable energy systems, power system protection, military projects, robotics and mechatronics, food drying and etc.

I am proud to note the following achievement: I am both advisor and executive manager of a national project with a budget of 35 million USD$. Our partners are MINISTRY OF SCIENCE, INDUSTRY AND TECHNOLOGY; THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY and TURKISH ELECTRICITY TRANSMISSION COMPANY. It took me one year of my hard work to prepare this project. Finally, the proposed project titled with "*Design and Implementation of Multi-level inverter based 100 MW back-to back HVDC system*" has been accepted. Both in the preparation and acceptance of the project, my previous knowledge on both high voltage and electric power systems have been played vitally important role.

In what follows, I present the overviews and future plans of the research topics.

2 SMART GRID CONTROL MODEL

Future smart grids will likely support bi-directional flow of electricity and include power production from multiple, disparate and uncontrollable sources due to a high penetration of

distributed renewable energy resources. Some of the more challenging problems for the future grid include maximizing the use and efficiency of renewable resources, and realizing optimal demand and power production responses that can complement renewable intermittency.

Integration of renewables together with energy storage systems has been motivated by the increasing attention to feature renewable energies from not only solar and wind power but also the excess generation from many customers. Effective use of renewable resources using battery systems can be realized by balanced transmission and distribution of such distributed resources with complementary demand and dispatchable generation responses.The spatial distribution, intermittency and uncontrollability of most renewable resources, however, make stable and reliable electricity transmission and distribution difficult especially with high renewable market penetration in large-scale complex power networks. For this reason, development of an autonomous distributed architecture that can realize optimum allocation of complementary demand and power response together with dispersed renewable energy resources is inevitably required to produce highly efficient and reliable operation of future power networks that will integrate millions of state-of-the-art real-time end-use devices.

a. Development of a Hybrid Energy Storage System Combined with an Efficient Charge Controller Unit Supplied from PV Source for Smart Micro Grid

Their costs and unstable operating characteristics are the main disadvantages of the renewable energy sources. Integrating Hybrid Energy Storage Systems (HESS) with renewable energy sources can make these intermittent renewable energy sources more dispatchable. In this project, different control methods for integrating intermittent renewable energy resources with energy storage for 3-phase 4- wire grid-connected electrical power systems are proposed for this purpose.

Since renewable energy is not stable and has intermittent characteristics, HESS will play a vital important role in renewable energy based 3-phase 4-wire grid connected electrical power infrastructure. In order to get more stable operating conditions, the produced energy should be stored and supplied for the end-user at the required appropriate times.

Firstly, a HESS containing ultracapacitors and Lion battery sources that is connected in parallel with the DC bus of the system will be designed and implemented, in this project. The proposed project will be a prototype system and can be expanded for large scale smart grid applications in future.

As a second stage of the project, an efficient charge controller unit supplied from PV source for smart micro grid will be realized.

Within the scope of this project a charge control system that will be used to charge lead–acid type batteries, LabVIEW based and remote access will be designed. For charge control circuit DC/DC converter with buck-boost type will be built and the system will be able to use both buck and boost modes when required. A microcontroller based system will be designed to measure and collect all parameters mentioned above and control the overall system. Charge control system should be operated not only by a controller that is run on a microcontroller, but also by a controller that will be run in a LabVIEW based system in computer.

Furthermore, it will be possible to access the charge control system via internet and the charge control algorithms of the system should be easily adopted and tested. Moreover, a solar module simulator will be employed to test different control algorithms on same conditions.

By the help of charge algorithms that will be developed within this project, it is foreseen that the efficiencies and the life time of the batteries that have been used on PV systems will be increased. Using different signal processing applications, State of Charge (SOC) and State of Health (SOH) parameters could be predicted. By tracking the SOH parameter continuously, we will be able to understand the improvement of the life time of the batteries.

b. Optimizing of PMU Placement Location Using a Pre-Determined Redundancy Index

In today's power systems, it is extremely important to maintain efficiency, sustainability and reliability of the generation, transmission and distribution of the electrical energy; hence it is mandatory to monitor the system continuously. Although the measurements constitute the backbone of the modern power systems (smart grid), it is well-known that they are not reliable and hence a state estimator should be employed.

The considered power system should be observable in order to perform state estimation. There are many measurement placement methods available in the literature for power system observability. Since those methods aim to determine the measurement design (number of measurement devices and locations of those devices) with minimum cost, most of the measurements in the resulting design are critical. In the absence of a critical measurement, the observability of the system is lost. Since errors associated with those measurements cannot be detected, a measurement design with many critical measurements is considered as a bad measurement design. In such systems, power system analysis methods such as fault location, model verification, bad data analysis/ detection, non-technical loss detection, cannot be applied properly, due to the fact that errors cannot be detected. In order to perform those applications properly, measurement redundancy is required. It is known that, in the presence of enough measurement redundancy gross error in the measurements can be detected and identified and hence the mentioned applications can be employed in the right manner. Although the necessity of measurement redundancy is emphasized in the literature, the studies on the degree of the measurement redundancy are quite limited.

In this project, it is aimed to develop a measurement placement algorithm. Phasor Measurement Units (PMUs) are employed with an increasing ratio both in our country and worldwide. Thanks to their synchro–phasor measurements, PMUs have become an essential element of the smart grid. Considering this, it is anticipated that those measurement devices will be preferred in the future's grid.

The proposed project differs from the PMU placement methods in the literature in various ways. The method not only considers the system observability, but also measurement redundancy, hence the state estimation robustness. Determination of the redundancy index will be one of the contributions of the project. State estimation robustness enables detection and identification of bad measurements. In order to minimize the number of PMUs to be placed to the system, the

measurement already installed at the system (PMU and/or conventional power flow measurements) and information of generation- consumption provided by the system operator will be employed in the solution. Thanks to that, one will be able to use the proposed method for future measurement design planning as well as improvement of the current measurement infrastructure of the operator's system.

Additionally aforementioned aims, to develop a method for neither of robust state estimation, bad data analysis, fault location, non-technical loss detection, etc. are the future aim of this project.

3 FUTURE PLAN

Sharing my expertise obtained knowledge with fellow academicians and students, putting forward new projects and being part in one of the largest, most progressive and innovative places of higher education would be a dream come true, for a faculty like me who loves to make researches. My dream is basically about on how to arouse grad and undergrad student's interest in smart grid, renewable energy systems, electrical power and high voltage technology, robotics, and mechatronics and to help them master the basic foundation of all these new generation concepts. Help maintain the highest quality in the E&E department and enhance students by teaching them new skills and techniques. The mastery of my subject areas will be of great help to become one of the dedicated professionals not only to teach but also to support and encourage students to reach as high a standard as possible so that students may develop the skills and attributes they need to succeed in their chosen occupational sectors and jobs. Additionally, I would expect to do projects in partnership with industry in order to constitute university-industry collaboration for both our department and our grad and undergrad students.

The goal of my research is to establish a distributed smart grid management model that uses energy storage systems effectively to optimize Distributed Energy Resources, minimizes power distribution loss, realizes a reliable and sustainable future grid, prevents blackout, and reduces CO_2 emission and cost of excessive power generation. I have dealt with essential aspects of prospective power networks so that optimization theories and algorithms being studied in the boundary domain between power systems and distributed network systems can be integrated into the proposed models. With the characteristics of prospective power systems such as voltage angles, admittances, generation costs, battery costs, and power delivery costs, I will extend the algorithmic solution and simulation environment to incorporate them. In addition, I also need to consider the profiles of demand and/or renewable generation so that optimization time span can be adjusted to reduce computation and distribution power loss costs. After verifying the proposed models with simulation, I aim to develop and deploy real systems that realize the theories and models.

Additionally, I would like to develop high level control strategies for electric power grids, with transmission and distribution grid control, dynamic power system interactions in hybrid AC / DC grids, design and development of high-power power-electronics circuits, distributed control and integration of inverter-based renewable generation and storage.