Global J. of Engng. Educ., Vol.8, No.1
Published in Australia

Centre for Education in Mechatronics (CEM)

Krzysztof Kluszczyński
Division of Mechatronics, Faculty of Electrical Engineering, Silesian University of Technology
ul. Akademicka 10, PL-44-100 Gliwice, Poland

The paper describes how mutual contacts between academics from Silesian University of Technology (SUT), Gliwice, Poland, and the UNESCO International Centre for Engineering Education (UICEE), based in Melbourne, Australia, have been systematically developed since 1993. It includes basic information about the host university and presents reasons for the foundation of the Centre for Education in Mechatronics (CEM) at Silesian University of Technology in Gliwice. Taking into account the different possible points of view regarding the specific role of mechatronics in engineering education, the mission, goals and objectives of the CEM that result from its double character as a UICEE satellite centre and an inter-faculty unit of the SUT, are underlined and discussed. The educational, organisational and research achievements that have been accomplished so far, as well as future plans, are outlined and elaborated on in this article.

INTRODUCTION

Many of today's manufactured products are the combination of mechanical and electrical components. Moreover, most of these products require microprocessors for their control. For many years, mechanical engineering, electrical engineering, control and computer science have been developing independently but when the complexity of products reached a very high level, the need for a new approach to designing them appeared [1].

Then, mechatronics, which can be treated not only as a technology, but also as a philosophy, came into being. Mechatronics is an integration of mechanical and electrical engineering with control and computer science not only for the designing, but also for manufacturing and their operation.

The systematically rising position of mechatronics in engineering education and in curricula of many universities was the reason for the foundation of a UICEE satellite centre devoted entirely to this new subject.

BASIC INFORMATION ABOUT THE HOST INSTITUTION: SILESIAN UNIVERSITY OF TECHNOLOGY (SUT)

Silesian University of Technology (SUT) is located in Gliwice, Poland. Gliwice is situated 35 kilometres west of Katowice, which is the capital city of the region called Upper Silesia. It is the most industrialised part of Poland, which possesses many coalmines and factories, and is nowadays endeavouring to face the new economical reality, and to adapt to quite different and challenging free market requirements. Gliwice is a city with a very long history, whose prosperity was associated with the neighbourhood of the silver and zinc mines in Tarnowskie Góry, which date back to the 16th Century (see Figure 1).

Such an industrial tradition has created a good background for the establishment of Silesian University of Technology, which, in only a few years, became one of the largest and most respectable academic establishments in Poland. The then University of Technology of Gliwice was founded just after the end of World War II in 1945.

The establishment and rapid development of the University, at its beginning, was also due to the territorial losses imposed upon Poland after World War II (in accordance with the infamous Yalta Agreement), which included the renown and old Technical University in Lwów (Politechnika Lwowska), founded in the first half of the 19th Century. Many distinguished academics of that University were transferred to the SUT, thereby strengthening its intellectual potential.

Originally, the University consisted of four faculties, namely: the Faculty of Chemistry, the Faculty of Electrical Engineering, the Faculty of Building and the Faculty of Mechanical Engineering. Today, Silesian

Figure 1: Illustration of the silver mines in Tarnowskie Góry (16th Century).

University of Technology consists of 12 faculties as follows:

- Faculty of Architecture;
- Faculty of Automatic Control, Electronics and Computer Science;
- Faculty of Civil Engineering;
- Faculty of Chemistry;
- Faculty of Electrical Engineering;
- Faculty of Mining and Geology;
- Faculty of Power and Environmental Engineering;
- Faculty of Mathematics and Physics;
- Faculty of Mechanical Engineering;
- Faculty of Materials Science and Metallurgy;
- Faculty of Transport;
- Faculty of Organisation and Management.

The Faculties of the SUT are located not only in Gliwice, but also in the neighbouring cities of Katowice, Zabrze and Rybnik. The present number of academics possessing PhD and DSc degrees is about 1,800 and the total number of students was close to 34,000 in the academic year of 2002/2003. The University infrastructure is very good and consists of many buildings; some of these can be considered historical buildings (see Figure 2).

BRIEF HISTORY OF THE COOPERATION BETWEEN THE SUT AND THE UICEE

The participation of professors from Silesian University of Technology in the activities and enterprises undertaken by Prof. Zenon J. Pudlowski started in 1991.

Figure 2. A view of the building of the Faculty of Chemistry (graphics by Tadeusz Siara).

Between 1991 and 1994, Prof. Krzysztof Kluszczyński took part in the seminars and discussion panels connected with the foundation of the International Faculty of Engineering (IFE) at the Technical University of Lodz, Lodz, Poland, led by Prof. Pudlowski. This was a very essential and significant event for contemporary engineering education in Poland, breaking the actual stiff rules and schemes, opening the teaching process in English, as well as introducing regular assistance of professors from abroad, especially Great Britain, Australia and the USA, in the realisation of interdisciplinary curricula in engineering.

The next idea, which involved the SUT (which unfortunately was not accomplished), was the formation of a so-called Technical University of Poland, with Faculties located in different Polish universities, and with the plan to situate two of the Faculties in Gliwice.

When, in 1993, the UNESCO Supported International Centre for Engineering Education was formally founded and started to organise regular international conferences that were devoted to engineering education, many educators from the SUT were involved in these events presenting their papers, and as members of steering committees, reviewers of the submitted papers and session chairmen [2].

The papers presented during these conferences by the authors from the SUT focused on the following subject areas:

- History of industrial architecture;
- Education for the protection of the landscape;
- Computer-aided education;
- International postgraduate and doctoral studies;
- Mechatronics.

It should be noted that two presentations described the reasons for the foundation of the *Centre for Education in Mechatronics* at this University. The first was a keynote address, authored by K. Kluszczyński, J. Serdyńska and J. Witeczek, titled *History of industrial architecture: means for transforming engineering students' attitude towards the environment*, which was delivered during the Opening Ceremony of the *Global Congress on Engineering Education*, held in Krakow, Poland, in September 1998 [3]. The second was a paper by B. Pochopień, R. Sosnowski, K. Kluszczyński and D. Krawczyk, called *How the idea of mechatronics has developed and evolved at the Silesian University of Technology*, presented at the *3rd Global Congress on Engineering Education*, held in Glasgow, Scotland, UK, in 2002 [4].

A logical continuation of the cooperation described above is active participation of the educators from the SUT on the Editorial Boards (Prof. Remigiusz Sosnowski and Prof. W. Zieliński), as well as on Advisory Boards and Reviewer Committees (Prof. K. Kluszczyński) of the two journals edited by UICEE, namely: the *Global Journal of Engineering Education* (GJEE) and the *World Transactions on Technology and Engineering Education* (WTE&TE).

Two interesting papers were published in the WTE&TE by Prof. Wojciech Zieliński, currently Rector of the SUT, titled: *Models of engineering education* (Vol.1 No.2, 2002) and *The application of the Bologna Declaration in Polish technical universities* (Vol.1 No.1, 2002) [5][6].

HOW THE SUT BECAME A PARTNER OF THE UICEE

Since 1993, Prof. Z.J. Pudlowski has repeatedly visited Silesian University of Technology and has been invited by the Rector's Office and the Dean's Office in the Faculty of Electrical Engineering at SUT (among others, he presented a lecture on the globalisation of engineering education, commemorating the 50th anniversary of the Faculty), and the Polish Society of Theoretical and Applied Electrotechnics (PTETiS) (being a foreign member of the Society). The growing intensity of contacts and mutual visits, as well as closer, regular and more productive cooperation, required a more steady and stable framework for the realisation of identified and prospective common initiatives.

The formal links between the SUT and the UICEE began with the UICEE individual memberships of Prof. B. Pochopień, Prof. Remigiusz Sosnowski, Prof. Wojciech Zieliński and Prof. Krzysztof Kluszczyński. The next stage was a contributing membership of the SUT within the UICEE, which took place in 1999.

The crucial event was the official visit of the SUT delegation, consisting of its Rector, Prof. B. Pochopień; Vice-Rector for Science, Prof. R. Sosnowski and Prof. K. Kluszczyński, to the Headquarters of the UICEE at Monash University in Melbourne. The prime objective of the visit was to sign the Memorandum of Agreement (MoA) on Partnership between the SUT and the UICEE at a gala ceremony held in the Monash University Staff Club on 14 January 2002. One of the agreement's resolutions was to establish a satellite centre of the UICEE at the SUT (the 9th UICEE satellite centre in the world) being a leading and unique UICEE sub-centre in the field of mechatronics, and called the *Centre for Education in Mechatronics* (CEM).

THE POSITION OF THE CENRE FOR EDUCATION IN MECHATRONICS IN THE STRUCTURE OF THE SUT

The Centre for Education in Mechatronics (CEM) at the SUT was formally founded on 1 May 2002, and it plays simultaneously two roles, namely:

- A satellite centre of the UICEE;
- An organisational (inter-faculty) specialised unit of the SUT.

The formal basis for the existence of the CEM as a satellite centre of the UICEE is based upon the Memorandum of Agreement on Partnership between the UICEE and the SUT. The mission of the CEM, from a viewpoint of the UICEE and within the UICEE Global Network, is presented in the next section.

The foundation of the CEM, as an organisational unit of the SUT, has been related to the resolution of SUT Senate, whose meeting took place in April 2002. This decision was preceded by very long discussions, lasting about two months, in which several important persons participated, such as Deans of the involved Faculties, as well as directors and professors from many SUT institutes. The elaborated and resolved Statute determines the purposes of the Centre within the SUT and in the framework of the academic establishment in Poland.

The full name of the Centre fulfils both roles: a satellite centre of the UICEE and an organisational unit of the SUT, and is as follows:

Centre for Education in Mechatronics, Silesian University of Technology, Gliwice, Poland - associated with UNESCO International Centre for Engineering Education, Monash University, Melbourne, Australia.

It should be emphasised that the abbreviation CEM corresponds perfectly to both English and Polish versions of the Centre's title:

- **C**entre for **E**ducation in **M**echatronics
- **C**entrum **E**dukacji w **M**echatronice

So, the acronym CEM stands for the name of the Centre in both languages.

MISSIONS OF THE CEM AS A UICEE SATELLITE CENTRE

The mission, fundamental goals of the Centre and its specific role within the UICEE Global Network are formulated in the Memorandum of Agreement. The main task of the Centre is to facilitate research, development and transfer of information concerning engineering education in mechatronics on a global scale.

According to the Memorandum, the established satellite Centre, working with the UICEE, will provide the focus for the development of academic and research related activities in engineering education within the sphere of mechatronics engineering and, where appropriate, will work together with the UICEE and the *Global Network of Engineering Educators* to further the globalisation of engineering education in mechatronics and, in particular, on the transfer of information on mechatronics to developing countries worldwide.

Mechatronics is a new interdisciplinary branch, whose name is derived from two words: mechanics + electronics. Its wide range comprises the following elements: precision engineering, electronics, electrotechnics, computer sciences, sensors, optoelectronics, pneumatics, applied hydraulics and materials technology. It deals with the analysis and design of complex systems with a high degree of technological and functional integration and with a powerful synergic bond of individual parts (mechanical, electromagnetic, electronic, optical and so on) that their separate examination would not be possible.

The decomposition of integrated mechatronics systems into simpler elements is non-effective and creates a serious threat that the essence of the integration may be lost or taken into account in a remarkably limited and paupered way. It results from the above explanation that mechatronics is undoubtedly a very important and promising discipline of engineering, but its successful development seems to dependent remarkably on a broad level of international cooperation and a vivid, mutually enriching exchange of ideas on a global scale.

ORGANISATIONAL STRUCTURE OF THE CENTRE

The Centre is chaired by the Director, who is nominated by the University Rector. According to the CEM Statute, it is also possible to nominate a Vice Director of the SUT. Each year, the Director is obliged to submit to the Rector a comprehensive report that describes the educational, organisational and research achievements.

The activities of the CEM are supported by the International Advisory Board (Międzynarodowy Komitet Doradczy) and the Academic Steering Board (Akademicka Rada Programowa).

The International Advisory Board has the following structure:

- Chairman: Rector of the SUT;
- Vice-Chairman: Director of the UICEE;
- Permanent Member: Director of the CEM.

The Rector individually nominates the other members from professors representing foreign and Polish academic institutions cooperating with the Centre.

The Academic Steering Board consists of the Director of the CEM (as its Chairman) and representatives of faculties, institutes and divisions from Silesian University of Technology, cooperating with the CEM in the realisation of its goals, and those involved in its all-Polish and regional enterprises. On 1 May 2002, the then Rector of the SUT, Prof. B. Pochopień, nominated Prof. Krzysztof Kluszczyński to be the Director of the Centre for Education in Mechatronics.

In December 2002, the Director submitted the first Annual Report for the first seven-month period of activity (1 May 2002 - 31 December 2002) to the then newly-elected Rector, Prof. Wojciech Zieliński.

RESEARCH, DEVELOPMENT, SCHOLARLY ACTIVITIES AND ACHIEVEMENTS

So far, the Centre has been involved in the organisation of three conferences, which are described below.

Seminar on Electrical Engineering BSE

Although the Seminar on Electrical Engineering BSE has been held since 1987, the assistance of the CEM (as the co-organiser) radically changed the nature of the Seminar. This resulted in a remarkable extension of topics (eg alternative and renewable sources of energy, photovoltaic batteries for the supply of motors and drive systems, wind generators, geographic information systems, intelligent buildings and protection systems, new powder magnetic materials, unconventional construction of electrical machines, multi-degree freedom electromechanical converters, mobile robots, microprocessor diagnostic systems, etc). Taking it into account the above, an extension of the name is planned so that it becomes a *Seminar on Electrical and Mechatronics Engineering*.

The attendance of three participants representing Gdynia Maritime University, Gdynia, Poland (a Partner institution of the UICEE and host university for the Centre for Maritime Engineering Education) in the Seminar BSE in 2003 considerably enriched the programme of the meeting. Prof. Henryk Śniegocki was invited by the CEM to present a lecture during the Opening Ceremony, related to the modern methods of the location of ships, allowing for GPS and DGPS techniques.

The Conference Proceedings have a unique form, resulting from the fact that the papers are published in two parallel languages: English and Polish.

International Doctoral Studies Workshop OWD

An International Doctoral Studies Workshop OWD for candidates for a doctor's degree was undertaken in 1999 with the intention to hold a scientific conference of a new type, having quite a different character and specifically creating a competitive and friendly atmosphere. The name of the Workshop emphasises a special nature of the meeting, which is characterised by mutual interaction and problem solving approaches, as well as continuous and vivid discussions.

The Workshop is assigned for young and aspiring researchers involved in mechatronics, electrical engineering, electronics, control systems, robotics and computer sciences, who are already in the course of acquiring scientific experience: those who pursue or are being prepared to pursue their thesis. The aim of the Workshop is to integrate the new scientific environment in Poland and in neighbouring countries by means of opening and facilitating contacts among candidates for doctorates, operating in the same or similar spheres of research, in various academic institutions and research institutes. So far, representatives from over 30 universities and research institutes from Poland, the Czech Republic, Slovakia and Lithuania have attended these workshops.

The Workshop is being held under the auspices of the Deans of the Faculties of Electrical and Electronic Engineering, as well as Computer Science, from all of the Polish technical universities. The Committee of Experts consists of the Heads of Postgraduate Doctorate Studies, supervisors (under of whose direction presented during the workshop dissertations are being made) and invited distinguished authorities who represent different fields of technical interest. The reviewers of the submitted papers are also members of the Committee of Experts. After a careful and deep review process, and on the basis of discussions during the Workshop, the Committee members also nominate one of the papers to the IEE Best Paper Award, which is funded by the Institution of Electrical Engineering IEE (Electromagnetics Professional Network).

The submitted papers are published in printed and CD-ROM formats. All of the presentations are recorded with the help of a video camera, and the CD-ROM includes, apart from the papers, short movies and photos.

The UICEE initiated cooperation with the OWD Organising Committee at the very beginning of the latter's foundation. The idea of the Workshop was firstly presented in the European academic establishment during the UICEE organised *3rd Baltic Region Seminar on Engineering Education*, which was held in Göteborg, Sweden, in September 1999 in a paper entitled: *A new initiative in the education of future doctors in Poland: workshops for candidates for a doctors degree – objectives, programme agenda and organisational issues* [7]. Its gradual and successful development was described then in detail and summarised in the presentation: *A doctoral studies workshop: the results and experiences gained after three years*, which was given at the *6th Baltic Region Seminar on Engineering Education* in Wismar/Warnemünde, Germany, in 2002 [8].

Actually, the idea of the consecutive award, promoting the cross-field research and interest among young researchers is under consideration as a *UICEE Best Interdisciplinary Paper Award*.

International Symposium on Fundamentals of Power Electronics and Electromechanics PPEE

The *International Symposium on Fundamentals of Power Electronics and Electromechanics PPEE* is

a well-established bi-annual meeting with a long tradition and average number of participants reaching 150. A new initiative, recently introduced by the CEM is a special session that is devoted entirely to mechatronics.

The most important enterprise for 2003, undertaken together with the UICEE Headquarters (Prof. Z.J. Pudlowski), the *Gottlob Frege Centre for Engineering Science and Design* (GFC), a UICEE satellite centre at Hochschule Wismar, Wismar, Germany (Prof. N. Grünwald and Prof. W. Schauer) and the satellite centre in Gliwice (Prof. K. Kluszczyński), was a visit of close to 20 Polish professors engaged in the field of mechatronics, as well as control systems, power electronics and sensors, to Hochschule Wismar and to a Siemens plant in Nürnberg, Germany, between 24 and 29 October 2003. The visit was under the theme: *Establishment and development of cooperation between Polish universities and Siemens AG under the auspices of Hochschule Wismar*.

This six-day meeting, whose programme included presentations, discussions and many visits to various laboratories, has strengthened considerably the links between the GFC in Wismar and the CEM in Gliwice, and has enabled the formulation of a detailed programme of common future research and mobility grants related to educational activities.

SPECIFIC LINKAGES WITHIN AND OUTSIDE THE UICEE GLOBAL NETWORK

The CEM at Silesian University of Technology is closely associated with the University's Division of Mechatronics in the Faculty of Electrical Engineering. The essence of this link is a personal union, generating many possibilities, which result from the fact that the Director of the CEM is simultaneously the Head of the Mechatronics Division. But, as stated earlier, the CEM at the SUT is an interfaculty unit and, because of that, it also cooperates with many other institutes and divisions at the Faculty of Automatic Control, Electronics and Computer Science, the Faculty of Mathematics and Physics, the Faculty of Mechanical Engineering, as well as the Faculty of Metallurgy and Materials Science, etc.

Very promising and good contacts have been established with important scientific societies, such as:

- The Polish Society for Theoretical and Applied Electrical Engineering (PSTAEE);
- The Polish Society for Theoretical and Applied Mechanics (PSTAM);
- The Polish Society of Applied Electromagnetism (PSAE);
- The Polish Society of Phonetics (PSP).

It is planned that, within the framework of the PSTAEE, a Committee for Mechatronics will be founded this year, which will be a close partner of the CEM.

The cooperation of the CEM with the International Network of Mechatronics Universities (REM Network) also plays an important role. The goal of the International Network of Mechatronics Universities is to exchange experiences in mechatronics between over 100 research and education institutions engaged in mechatronics all over the world, which actively participate in the REM Network. Because of the identical goals of the CEM and the REM Network, it seems that the CEM can play a crucial role in the future, acting as the bridge and a strong link between the so-called *UICEE Global Family of Engineering Educators* and the International Network of Mechatronics Universities (REM Network).

Holding an annual International Workshop on Research and Education in Mechatronics is one of many objectives of the REM (eg Bochum 2000, Kiel 2001, Copenhagen 2002, Bochum 2003).

The position of Polish mechatronics was very well appreciated by the allocation of the organisation of the *5th International Workshop on Research and Education*, which is to be held in Poland in 2004, with the CEM as one of the main co-organisers. Consecutive workshops will be held in France, Sweden, Estonia, Italy and the Czech Republic. During the 4th Workshop held in Bochum, introductory contacts were also established between the CEM and the German Working Group for Mechatronics (Chairman: Prof. Reiner Dudziak), as well as the Danish Association of Mechatronics (Chairman: Prof. Finn Conrad).

PLANS FOR THE IMMEDIATE FUTURE

Many planned ventures and conferences have been mentioned in the previous sections because they are the logical continuation of the realised educational, research and organisational tasks. Apart from the conferences cited above, there are other activities that are planned for the immediate future, such as:

- *5th International Workshop on Research and Education in Mechatronics*, September 2004.

- *10th International Symposium on Fundamental Problems of Power Electronics and Electromechanics* PPEE, with a CEM session on mechatronics, December 2003.
- *6th International Doctoral Studies Workshop OWD*, with the IEE Best Paper Award and the UICEE Best Interdisciplinary Paper, October 2004.
- *18th Seminar on Electrical and Mechatronics Engineering BSE*, January 2005. It is envisaged that this new initiative, conceived by the CEM, will run in close cooperation with the Centre for Maritime Engineering Education at Gdynia Maritime University. This new venture is a seminar devoted to interdisciplinary activities in science and engineering under the challenging theme: *Interdisciplinary Research and Cross-Field Education*, which will probably be held on board the famous Polish tallship, *Gift of Youth* (*Dar Młodzieży*), in September 2004.

The great hope of the CEM is connected with the foundation of the 3rd UICEE satellite centre in Poland at the Technical University of Częstochowa, which took place in September 2003. This results from a conviction that the two current satellite centres, Gliwice and Gdynia, constituted a mutually enriching and friendly pair, but three centres have the chance to become a harmoniously cooperating group. The name for this group has already been formulated: *UICEE Polish Network*.

CONCLUSIONS

The idea of mechatronics is both a new engineering field of interest and, simultaneously, a new philosophy in engineering, reflecting a novel approach to integrated complex technical devices. In other words, it means that mechatronics can be characterised as either a new interdisciplinary engineering specialisation or as a new high quality in engineering.

Introducing mechatronics into research and education activities requires the breaking up of many traditional barriers and, as a consequence, a great deal of engagement and enthusiasm in connecting experiences and engineering knowledge in quite a new, flexible and easy way by rearranging the whole. It seems that the educational, organisational and research activity of the Centre for Education in Mechatronics (CEM), a satellite the UNESCO International Centre for Engineering Education (UICEE), will be helpful in the successful realisation of this important educational process.

CONTACT

Prof. Krzysztof Kluszczyński
Silesian University of Technology
Faculty of Electrical Engineering
Division of Mechatronics
Ul. Akademicka 10A
44-100 Gliwice, Poland
Telephone: +48 32 237-28-03
Fax: +48 32 237-12-58
E-mail: kkluszcz@polsl.gliwice.pl

REFERENCES

1. Pudlowski, Z.J. and Darvall, P.LeP., UICEE: world leader and focal point in engineering education research, development and information transfer. *Proc. Global Congress on Engng. Educ.*, Krakow, Poland, 17-21 (1998).
2. Kluszczyński, K., Witeczek, J. and Serdyńska, J., History of industrial architecture for engineers. *Proc. 1995 Inter. Congress of Engng. Deans and Industry Leaders*. Melbourne, Australia, 419-423 (1995).
3. Kluszczyński, K., Serdyńska, J. and Witeczek, J., History of industrial architecture: means for transforming engineering students' attitude towards the environment. *Proc. Global Congress on Engng. Educ.*, Krakow, Poland, 37-40 (1998).
4. Pochopień, B., Sosnowski, R., Kluszczyński, K. and Krawczyk, D., How the idea of mechatronics has developed and evolved at the Silesian University of Technology. *Proc. 3rd Global Congress on Engng. Educ.*, Glasgow, Scotland, UK, 163-166 (2002).
5. Zieliński, W., Models of engineering education. *World Trans. on Engng. and Technology Educ.*, 1, **2**, 249-251 (2002).
6. Zieliński, W., The application of the Bologna Declaration in Polish technical universities. *World Trans. on Engng. and Technology Educ.*, 1, **1**, 137-140 (2002).
7. Kluszczyński, K. and Marusak, A.J., A new initiative in the education of future doctors in Poland: workshops for candidates for a doctor's degree - objectives, programme agenda and organisational issues. *Proc. 3rd Baltic Region Seminar on Engng. Educ.*, Göteborg, Sweden, 45-46 (1999).
8. Kluszczyński, K., Kłapyta, G., Pochopień, B. and Marusak, A., A doctoral studies workshop: the results and experiences gained after three years. *Proc. 6th Baltic Region Seminar on Engng. Educ.*, Wismar/Warnemünde, Germany, 87-90 (2002).

BIOGRAPHY

Krzysztof Kluszczyński was born on 11 July 1950 in Brzeszcze, Poland. He completed the Faculty of Electrical Engineering at Silesian Technical University in Gliwice in 1973. He obtained PhD and DSc degrees from the same University in 1978 and 1988, respectively. The President of the Polish Republic appointed him a full professor in 1996.

Prof. Kluszczyński's research interests include mechatronics, electrical machines, drives, power electronics and circuit theory. He has published three books, namely: *Parasitic Torque's in Squirrel-Cage Motors* (1993); *Modelling of Induction Machines Allowing for MMF Space Harmonics* (1995), and *Step by Step Analysis of Induction Motor Allowing for Slotting* (2003), as well as over 180 papers in the field.

Prof. Kluszczyński is presently President of the Polish Society for Theoretical and Applied Electrical Engineering (Warsaw), Director of the Centre for Education in Mechatronics (SUT, Gliwice) and Head of the Division of Mechatronics at the Faculty of Electrical Engineering (SUT, Gliwice).

Prof. Kluszczyński was accorded the *UICEE Silver Badge of Honour* for his distinguished contributions to engineering education in 1999.