

Colloquium on higher education of electronic engineering in Serbia

Faculty of Electronic Engineering, May 18, 2004,
organized within the MIEL'04 Conference

Niš, January 23, 2004.

Dear colleague,

Within the Tempus CD_JEP-17028-2002 a project is undertaken for innovation of the curriculum in Electronics at the faculties teaching electronics in Belgrade, Niš, and Novi Sad. The realization of this project coincides with the initiative that started one year ago at the Chair of Electronics at the Faculty of Electronic Engineering in Niš. Now we propose these two initiatives to meet at a "Colloquium on higher education of electronic engineering in Serbia" that would take place on May 18, 2004, at the faculty of Electronic Engineering in Niš, during the MIEL'02 conference. In the next an attempt will be given to explain the possible goals and scope of this meeting. Also the way in which it should be organized will be proposed. A list of possible invited speakers will be given, too.

Electronics, alike any other trade, becomes more and more influential on the human society. The reason for that is mainly due to the fact that the very electronic products are produced in huge quantities so interfering with every one's life. In addition, electronic subsystems become part of almost any industrial product nowadays. This is why the educational institutions on electronics are so widespread and why tremendous interest for studies of electronics is present for a long period of time. To have such influence, however, this trade should cope with several circumstances, two of which will be mentioned here.

Being one of most influential trades, electronics asks for responsibilities in higher education. The way how and what the students are thought in school now, will undoubtedly influence the human society tomorrow. And tomorrow means short and long term. From the other side, thanks to the fast advance of the trade the amount of knowledge whiten it is rising exponentially imposing specific request to the students what, in general, is not encountered within other trades. This, to say in soft terms, generates a slight reluctance or fear of studying electronics.

A specific aspect related to higher education in Europe now is the request for diploma compatibility and student mobility what is inherently expressed in the so called "Bologna Declaration". From the other side, here in Serbia, the subject of diploma compatibility within the country is formally resolved but student mobility is impossible both because of the way how inscription at the university is done, and because of the existence of fundamental differences among the curricula at different faculties.

Finally, the last innovation of the curriculum in electronics in Serbia was performed eight years ago. Having in mind the historical circumstances one may say that it was a great success. Now, however, one should think about European standards and no excuses for the legging are to be sought.

Having all this in mind, while starting the discussion about teaching electronics, in a personal opinion of the author, one should consider many aspects. In the next an attempt will be given to list possible set of subjects to be discussed and possible set of questions to be answered. Of course, the following set of views is not in any respect considered complete and exclusive.

One should address at the beginning what electronics as subject should encompass. What is an electronic engineer supposed to do while in industry. What amount and quality of knowledge related to separate disciplines should take with him at the end of the studies. According to this one should consider the set of sub specializations that are needed (and possible) for the department of electronics. What systems should be considered as electronic systems and thought within the department of electronics.

Not only electronics is thought for electronic engineers. Different neighbouring disciplines are to be touched during education. In that sense a question arise as to how much automation, software, telecommunication, information technology etc. will be necessary for an electronic engineer to become versatile an able to accommodate to the challenges of the industrial life.

Similar questions arise when the neighbouring disciplines are to be considered. Namely, the amount of electronics knowledge needed for telecommunication, automation, energy etc. was always triggering discussions among professionals.

The very process of teaching is also to be considered. Questions such as the amount of laboratory work, exercise, and technology of teaching are of primal importance. Here investments in education i.e. price of the curriculum innovation is to be highlighted. Question is whether one can start any innovation with no budget. In other words, a question arise as to how can modern engineering knowledge be transferred to the students with technology of teaching as old as 2000 years.

Subjects referred to as "fundamental disciplines" such as physics, material science etc. are to be discussed separately. Namely, most of the knowledge given at these disciplines (especially within physics and mathematics) suffers of two deficiencies. First, a grate amount of teaching is repeating the high-school knowledge what spends time on the expense of the engineering education. Secondly, the rest of the knowledge is thought according to traditional curriculum that was civil and mechanical engineering oriented and politically loaded (Newton-mechanics, fluids, geometry, three-dimensional mathematics, abstract algebra, social and political sciences and similar). Having no intention to reduce what is necessary, the question arise as to what is the optimal way of transferring basic knowledge while not overloading the students, and misleading from the main-stream knowledge.

A special consideration should be the dynamics of improvement of curriculum. Namely, one should teach new knowledge permanently, of cause. Question is, however, should that be done by innovation of contents of existing set of fixed subjects or by permanent (or periodical) innovation of the subject list. In the first case we have a situation in which no equal diplomas will be given neither at the given faculty (looking in time) nor at different faculties (looking in space). In the second case a question arise on compatibilities of diploma having in mind that divergence in the subject list may happen very easily.

The foreign participants are expected to contribute to the collective opinion that we are trying to build here by writing and speaking about their personal views and experiences, and about the state of the art and future trends in their countries. Representation of the existing curricula will be welcomed.

These and many others are the questions we are to address during our meeting. We expect everyone will express his own opinion and will influence the rest of us to improve our views to the subject. The "Proceedings" of the Colloquium is expected to be one of the basic materials allowing the entrance the next phase of improving the curriculum of electronics.

To make this colloquium as successful as possible the following colleagues were invited to prepare their contributions:

Prof. Y. Papananos, University of Athens, Head of the Tempus JEP
Prof. O. N.-T. García, University of Madrid, Participant to the Tempus TJP
Prof. M. Popović, University of Belgrade, Participant to the Tempus TJP
Prof. V. Malbaša, University of Novi Sad, Participant to the Tempus TJP
Dr V. Zerbe, University of Ilmenau
Dr. M. Zwoliński, University of Southampton
Prof. B. Djordjević, University of Niš, Chair of Electronics
Prof. M. Radmanović, University of Niš, Chair of Electronics
Prof. P. Petković, University of Niš, Chair of Electronics
Prof. N. Stojadinović, University of Niš, Chair of Microelectronics
Prof. D. Pantić, University of Niš, Chair of Microelectronics
Prof. B. Milovanović, University of Niš, Chair of Telecommunications
Prof. D. Drača, University of Niš, Chair of Telecommunications
Prof. G. Djordjević, University of Niš, Chair of Automation
Prof. B. Dimitrijević, University of Niš, Chair of Measurements
Prof. R. Stanković, University of Niš, Chair of Informatics and computer techniques.

This list, however, should not be considered neither as final nor as exclusive. We consider this Colloquiu open to any participant willing to give a contribution to the discussion with completely equal treatment of both the written contribution and the oral discussion. In fact this letter should be considered as open invitation. No contribution will be rejected.

The participants are expected to send a written contribution of approximately four pages to

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no later than March 01, 2004. This will allow as enough time to prepare the proceeding in advance and to organize the complete Colloquim.

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