

РОЗДІЛ IV

РОЗВИТОК ОСВІТИ В УКРАЇНІ ТА СВІТІ. МЕТОДОЛОГІЯ НАВЧАННЯ ФІЗИКО – МАТЕМАТИЧНИХ НАУК

EXCHANGE OF EXPERIENCE: A SYLLABUS ON HISTORY OF TECHNOLOGY IN ROMANIAN TECHNICAL HIGHER SCHOOLS

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Abstract

The paper presents the syllabus on History of technology in Romanian Technical Higher Schools of Transilvania University of Braşov, from the Faculty of Electrical Engineering and Computer Science, the Department of Electrical Engineering and Applied Physics.

The discipline is part of the compulsory disciplines, for our first year students, from the Electrical Engineering of english language study program, for the BA level.

The introduction of this discipline in the higher education syllabus arose from the necessity of training our young people and constituting the basic baggage of general culture necessary for a specialist in the field of electrical engineering.

The aim was to familiarize students with information on: the evolution of techniques and technology in the historical periods of the evolution of human society; knowledge of the important personalities of the history of science; knowledge of the great discoveries in the field of electrical engineering, and so on.

The main result is the use of the knowledge and skills obtained during the course by the participation and collaboration of our students in the online publication of the European Youth Magazine's Pupil's Magazine on History of Technology - a learning tool based on the intercultural exchange of experiences.

Keywords: syllabus, history of technology, students, technical higher schools

Introduction

The course of History of Technology and Professional Communication was introduced as an independent discipline in 2004, for the 1st year students of Electrical Engineering specialization, from the Faculty of Electrical Engineering

and Computer Science, the Department of Electrical Engineering and Applied Physics.

In the curriculum, the total number of hours per semester is 42 hours and the number of hours per week is 3: out of which 2 hours of lecture and 1 hour of seminar.

The general objectives, resulting from the specific competences to be acquired of the course are:

- Acquisition of knowledge and skills for professional carrier development
- Development of the knowledge on the basic concepts in history of technology: the factors and events which have determined the evolution of technique and technologies; the impact of conventional and new technologies on the human society development; the activity of the great personalities and schools who have contributed to the development of electrical and electronic technologies.
- Development of the analyze capacity of the age in which the electric engineering was developed and the connection with other local, national, international elements of culture and civilization.
- Development of the responsibility and ethical spirit in conformity with ethic code of engineer.

The specific professional competencies of this course are:

1. Identification of fundament technologies in electrical engineering in relation to modeling, simulation and testing the electrical systems
2. Interpretation of the modeling, simulation and testing impact on the electric system of a technological process designing
3. Optimal selection of the specific electric system required by a technological process
4. Evaluation of the technological process impact on the operation and performances of the electric systems
5. Conceiving the technological documentation for electric system manufacturing
6. Technological design of o specific electric system

The transversal competencies are:

1. Identification of the objectives, resources, requirements, and opportunities, stages of development, risks
2. Identification of roles and responsibilities in a multidisciplinary work team and applying the cooperative technics and efficient work-group.

The specific objectives of the course

The specific objectives of the course are:

a) Cognition competences:

- The student should know the basic principles of the history of technique/technology.

- The student should define the specific competences needed for an electrical/electronic engineer in correlation with the characteristics of technological epochs.
- b) Practical skills:
- At the end of this subject the student will know to analyse, to characterise and to do hierarchies the techniques and technologies, to extract the redundancy and to use the new elements from different technologies for the future new technical projects.
- c) Communication and relational skills, attitude:
- The student will know to use correctly the specific terms of the subject.
- The student will have team work capacity and a human, technical attitude characterized by creativity and innovation, with respect and interest for artifacts created by the humanity, with respect to the environment.

Content of the course

The course content is as follows:

C1. Communication as process. Communication model and forms; active listening; assertive communication; Oral and writing communication. Applications.

C2. Career and professional development. Career and professional career concepts; Management and career development; planning tools; Career integrated in the concept of sustainable development.

C3. Engineering and engineers - electrical engineering case study. Engineering methodology; regulations; branches of engineering; Electrical engineering - evolution, methods and tools, branches.

C4. Cultures and Civilization at the beginning of the 21st Century. About values, culture, civilization, technique, technology, artefacts. Relevant examples

C5. The role of science and connections with technology. About science; Methods and principles of scientific thinking; Methods and principles used in technology history; The role of science and technology history in professional development; Connections with unconventional and conventional technologies.

C6. Developing knowledge about electricity by the 19th century. Possible context of science development; experiments and theories of electricity.

C7. Artefacts of electricity. Electrostatic generators; Electric capacitor; Measurement instruments; Personalities in electrostatic application development.

C8. Developing knowledge about magnetism. Magnetism in the ancient world; magnetism in the 12th-17th centuries; earth magnetism; Compass evolution; Classical theories of magnetism and specific technologies; Personalities in magnetism; Applications development.

C9. Discovering and applying the electromagnetism. The magnetic effect of electric currents; Electromagnetic forces; Resistance in electric circuits; Law of electromagnetic induction; Development of electromagnetism theory.

C10. Electricity and magnetism in 19 – 20-th centuries. Development and evolution of the electrical machines in the 19-th and 20-th centuries; Experimental and theoretical bases for electromechanics, electronics and radioelectronics.

C11. Development and evolution of electrical engineering in Romania. Telegraph and telegraph communication systems; Telephone and wireless communication systems; Homo Electro-Technicus Eminent.

C12. Development of electromagnetic converter systems in Romania. Electrical lighting; Electrical traction; Electric drives in industry.

C13. Electrification in Romania (1882-1992). Development of the supplying, transportation and distribution system in Romania; Way of utilisation of electric energy; performances; Personalities.

C14. Complexity of technical and technological systems. Advanced communication systems; Computers; Artificial intelligence; Biotechnologies; Ethics in engineering.

Content of Seminar

The content of seminar is as follows:

S1. CV- Curriculum Vitae

Letter of intent and Career plan as tools for electrical engineer career development.

S2. How to write a scientific paper on History of Science and Technology

S3. Internet data bases as scientific information source.

S4. Redesigning an artefact using modern tools and technologies

S5. Technology in Ethnographic Museum of Brasov.

S6. Sinaia hydroelectric plant as bases for power network system development.

S7. Ppt presentation – Instrument of oral communication

For this discipline students will have to prepare a portfolio.

The condition to enter in the final evaluation is to have completed portfolio, which consists of:

1. Curriculum Vitae,
2. Self-Evaluation Report,
3. SWOT Analysis for supporting the professional development career,
4. Scientific Paper in the field of History of science, technique and technology.

Curriculum Vitae it will be written according to the European CV model, having the purpose of finding a practical internship; A photo will be attached to the resume.

Self-Evaluation Report and SWOT Analysis are designed for the purpose of self-knowledge and data acquisition for the development of the professional career plan, having as aim the successful completion of studies of the university undergraduate program in the field of Electrical Engineering.

Scientific paper is about writing and presenting a scientific article. The methods of teaching seminar are: work groups, project based learning, interactive method and also oral communication of the developed paper.

Evaluation criteria

Evaluation criteria for course and seminar:

- Defining the concepts used in engineering communication and in history of technology methodology.
 - Exercising the oral and written communication in explanation, justification and comparative analyses of the evolution of technique and technology.
 - Application of the concepts to electrical and electronic engineering technologies in oral communication.
 - Correctness of the knowledge included in proposed portfolio.
- Evaluation of the portfolio takes into account the attendance at the seminar, the timely delivery of the documents and their correctness.
- Penalties evaluation: Non-delivery on time (- 2 points); Noncompliance of article structure and lack of scientific references (- 2 points), etc.

Results

The main achievements observed at the students are:

- Efficient use of information sources and resources for communication and assisted training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.
- Self-control of the learning process, diagnosis of training needs, reflective analysis of one's own professional activity.
- Development of aptitudes for research and scientific analysis of bibliographic sources, openness to education and further training

REFERENCES

1. Elena Helerea, Marina Cionca, Mircea Ivanoiu, Technology in Times of Transition, ICOHTEC 2014 Symposium, Editura Universitatii Transilvania din Brasov, 2014, pp. 440, ISBN 978-606-19-0391-7 (CD), ISBN 978-606-19-0382-5 (CD).
2. Herlea, Alexandru, Advanced technology education and industrial research laboratories in 19th century France: the example of conservatoire des arts et metiers in Paris, San Francisco Press, 1986, p. 110

3. Herlea; Alexandre, Weber, Wolfhard, Globalisation and technology transfer. London: International Committee for the History of Technology, 2002, p. 44.
4. www.epmagazine.org
5. „Ideas for Intercultural Education”, Simon Marginson, Erlenawati Sawir, Palgrave Macmillan, 2011, USA.
6. Helerea Elena, Evolution of Techniques and Technologies. Electrical Engineering Case Study. Note de curs. Universitatea Transilvania din Braşov, 2011.
7. Nicolaide Andrei, Contribution of N. Vasilescu Karpen to the development of Physics and Electrical Engineering, Revues Roumaine des Science Technique, Janvier-Mars, 1998, 123-143 pag.
8. Helerea E., Pană Gh., Lungoci C.: Some Aspects of the Problem-Based Learning applied to Electrical Engineering, Proceeding of International Conference OPTIM, May, Brasov, 2006, pp.145-151.
9. P.S. Perkins, The art and science of communication : tools for effective communication in the workplace, Hoboken: John Wiley and Sons, 2008; Cote: 316/P52; III.22948.
10. *** Collection of papers in IEEE Spectrum and EPMagazine.

PROMOTING THE HISTORY OF SCIENCE AND TECHNOLOGY IN YOUTH MAGAZINES

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Abstract

The paper presents the general coordinates of the international cooperation educational project between Transilvania University of Braşov, Dr. Ion Mesota National College of Braşov, Romania, Bogio Lera High School of Catania, Italy, Experimental High School of Thessaloniki, Greece, and Julio Verne Secondary School of Bargas, Spain.

A current context and the main issues that led to the development of this program is underlined, and the various fields of activity involved in the project are described, including intercultural exchanges, workshops, writing and editing articles, reviewing articles, editing the magazine and maintaining the internet site.

All these activities are performed by participating students along with coordinating teachers, the main responsibilities being assigned to students, under