

European Society for Engineering Education

**International Conference
on Physics Teaching in Engineering Education**

10 - 12 September 2009 in Wroclaw, Poland

Call for papers

The conference will focus on all aspects of **physics teaching in engineering education**. It will provide a broad exchange forum of ideas and experiences within whole Europe. PTEE conferences are organized by the Working Group on Physics of Société Européenne pour la Formation des Ingénieurs (SEFI) in two-year periods. PTEE 2009 will be held in Wroclaw, a historical and picturesque city.

The plenary sessions will be devoted to extremely novel aspects in physics teaching and learning. The lecturers come from the Netherlands, Sweden, USA and Poland. The main theme of the conference is “Strengthening key competencies for engineers”, where Physics is the key.

All physicists concerned with physics teaching in engineering education are invited to contribute to the PTEE conference with their latest achievements and experiences. A broad variety of topics will help to find something special to everyone interested in teaching. There are three forms of contributions: oral presentation, poster presentation and workshop interactive demonstration.

Abstracts of the conference contributions should be submitted electronically by 30 March 2009. The authors’ guide is available at the conference website.

Any question? Ask board@ptee2009.eu

Looking forward to meeting you in Wroclaw,

Prof. Ryszard Poprawski
(PTEE 2009 Organizing Committee – Chair)

Assoc.Prof. Beata Radojewska
(PTEE 2009 Organizing Committee – Secretary)

visit our website

<http://ptee2009.eu>

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PTEE ORAL PRESENTATIONS IN CHRONOLOGICAL ORDER

Thursday

- Students' understanding of quantum scattering (Invited Lecture)
Ake Ingerman [ptee 01]
- POF technology for pressure sensing and resin cure monitoring
Lucia Bilro, Joana M. Figueiredo, Catia A. Alves, Joao Lemos Pinto [ptee 02]
- Orientation on profession and study
C.A. Swarts, A.J. Lock, A.M. Notenboom, M.C. Vloemans [ptee 03]
- Physics for engineers in 120 hours
Jacek Wlasak [ptee 04]
- An introduction to numerical modelling in physics
Pawel Scharoch [ptee 05]
- Physical and non-physical quantities and units. The case study of candela.
Andrzej Zięba [ptee 06]
- How big and how old is the Universe or the most important number in the Nature
Andrzej Radosz [ptee 07]
- Remote Real Experiment
Sona Haluskova [ptee 08]
- Type II heterostructures in optoelectronic devices operating in mid-infrared spectral range
Konstantin Moiseev [ptee 09]
- Teaching collisions: laboratory frame vs. Center-of-mass frame
Stefan Nitsolov, Maya Mitkova [ptee 10]
- Project Based Learning in Photonics Research
A.J.Lock, J.H.R. Lambers [ptee 11]
- Spatial inhomogeneities identification in radially symmetric dielectric medium
Stanislav Minarik, Vladimir Labas, Juraj Slabeycius [ptee 12]
- Development of an all fibre interrogator system
Silvia Correia, Lucia Bilro, Rogério Nogueira, Joao Lemos Pinto [ptee 13]
- Technology enhanced physics education (Invited Lecture)
Anton Ellermeijer [ptee 14]

Friday

- SCALE-UP, a classroom environment to facilitate active, collaborative learning
(Invited Lecture)
Robert J. Beichner [ptee 15]
- Is the first law of motion the conclusion of the second one?
Jacek Wlasak [ptee 16]
- Investigating the model 'learning of a complex concept' – the process of learning in a course in electric circuits
Jonte Bernhard, Anna-Karin Carstensen, Margarita Holmberg [ptee 17]
- An attempt to incorporate flexibility in physics laboratories: laboratory immersion
Fien Verelst, Greet Langie, Johan Van Den Bosshe, Walter Lauriks, Paul Janssen, Mieke De Cock [ptee 18]

- Coach, a Versatile Learning Environment for Mathematics, Science and Technology Education
Ton Ellermeijer, Pavel Pesat [ptee LastMinute]
- The impact of the Bologna Process upon the physics teaching
in the university of technology
Janusz M. Pawlikowski - Bologna Expert [ptee 19]
- Detecting and discussing errors - a specific didactical tool?
Stefan Stankowski [ptee 20]
- Graphical programming with LabVIEW - introduction and hands-on
Jaakko Kerola, Paweł Reszel (NI sponsored lecture) [ptee 21]
- Physics in the garden (Invited Lecture)
Piotr Pierański..... [ptee 22]

Saturday

- Non-technical skills as key competencies for future engineers.
Looking for a balance between Physics, Mathematics and Social Sciences
(Invited Lecture)
Erik de Graaff [ptee 23]

PTEE POSTER SESSION PRESENTATIONS AND WORKSHOPS

Thursday Posters

- Application of cholesteric liquid crystals in didactic presentations of some thermal
phenomena
Wiesław Borys [ptee 24]
- On the electric capacity in multipurpose experiments - from theory to applications
R. Poprawski, J. Komar, A. Kolarz, A. Ciżman, A. Sieradzki..... [ptee 25]
- Use of commercial sensors in physics courses
Gunnar Eckert, Orjan Nilsson..... [ptee 26]
- Photo-electric physics laboratory for electronics students
Ewa Popko [ptee 27]
- Practical applications of Peltier moduli in student laboratories
**R. Poprawski, A. Ciżman, A. Kolarz, J. Komar, T. Marcinişzyn,
B. Naglik, A. Sieradzki** [ptee 28]
- Computer controlled experiments as a new approach to practical physics teaching
Tomas Vitu, Danuse Novakova, Zuzana Mala [ptee 29]
- Designing the advanced level physics laboratory exercise - some comments
Intikhab Ulfat [ptee 30]
- The application of 'MATHEMATICA' programme in teaching technical physics - the
development
Piotr Duka..... [ptee 31]
- Heuristic methods combined with programming in teaching
of semiconductor physics
Marcin Gluszak, Kazimierz Sieranski, E.Beata Radojewska [ptee 32]
- "TIPS" for innovation
B.Busov, M.Bartlova, J.Brustlova [ptee 33]
- Didactic software for polarized light transmittance calculations
Karol Tarnowski, Włodzimierz Salejda..... [ptee 34]

Comparison between theoretical and computed results obtained from the simulation program SYMFIZ Wiesław Polak	[ptee 35]
Physics repetition for students enrolled to Poznan University of Technology Henryk Manikowski	[ptee 36]
Open source programs as a platform for teaching selected issues in physics Rafał Orlik, Grzegorz Pawlik	[ptee 37]
Evaluation of specific charge of the electron Zuzana Mala, Danuse Novakova, Tomas Vitu	[ptee 38]
Lessons from scaling Maciej Mulak, Mieczysław Pluta	[ptee 39]
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Modes Vibration of bodies and musical instruments Anna Danihelova	[ptee 41]
A way how the interest in studying physics and technology can be increased Peter Hockicko, Gabriela Tarjányiová	[ptee 42]
The impact of the teaching movies on the level of the students' knowledge A.Bluma, I.Klincare, J.Blums	[ptee 43]
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Do physical and technological sciences have a future in lithuania? Science teaching at secondary and at higher school, Pupils'/students' involvement in science studies and gender differences. Aurelija Novelskaite, Zivile Rutkuniene	[ptee 49]
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Saturday discussion workshop

Physics teaching: facts and visions. The discussion workshop. "PTEE 2009" Program Committee and Organizing Committee	[ptee 54]
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PERCEPTION LEVELS IN PHYSICS EDUCATION

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The aim of this study is to specify the learning levels of students in physics at Engineering faculties. The sample of this study consists of prospective engineers who have been studying at fourth year at the Technical Faculty of Education, Mersin University, Turkey. In order to collect data, a likert-type Perception Level Scale for "Subjects in Physics" with a questionnaire, which has 38 questions, have been used for this aim. In addition to these questions seven more open ended questions have also been asked. In quantitative analysis, frequencies and percentages have been introduced as cross tables. Qualitative data have been analyzed by using descriptive analysis technique. In conclusion, recommendations have been given about physics instruction strategies at Technical and Engineering Faculties.

Keywords: Physics Education, Technical education, Likert type Perception Level

INTRODUCTION

In today's world, an incredible progress in science and technology attracts huge demands on Engineering and Technical education. As a base for technological sciences, engineering faculties have to focus on new educational processes to achieve success for future investigations. In the field of both scientific and technological education, physics education should be the first and one of the most important goal with new strategies to be achieved. One of the main problem in teaching process of Physics is the imagination factor that has to be created in students brain and must be conducted by real world examples [1-5]. However, a significant ratio of student consider the physical laws and the "life" as separate. This problem cause Physics seem to be the most difficult lesson that can not be understandable in vision. Due to problems met in physics education, teaching staffs should provide new and effective strategies and this must be the first and one of the most important step.

Specifying the learning levels of students in physics at Engineering and Technical faculties is the aim of this study. The sample consists of prospective engineers who have been studying at third and fourth year at the Technical Faculty of Mersin University. A likert-type Perception Level Scale for "Subjects in Physics" with a questionnaire, which has 38 questions, in order to collect data, have been used for this aim. In addition to these questions seven more open ended questions have also been asked. In Likert type sample scale has five response alternatives as; Strongly approve, Approve, Undecided, Disapprove, and Strongly disapprove [1, 2]. In Likert type questionnaire, reliability assessment might be used to find the correlation between the item score and the total procedure.

In the Perception level process, the questionnaire contains questions and scaling grades on the understandability of subjects and motivations in physics. We have intended to

find out the reasons of problems confronted in physics teaching process at Technical and Engineering Faculties. Students from different departments of Technical faculty, i.e. Computer Engineering, Electronics and Electrical Eng., Mechatronics, have different interest in the field of science. So, in some details, the problems may differ from department to department. Analysis of the answers to the questions in the questionnaire reveal so interesting details in strategies of physics teaching.

Qualitative data have been analyzed by using descriptive analysis technique. In conclusion, recommendations have been given about physics instruction strategies at Engineering Faculties.

DEVELOPMENT

Physics has vast area of applications in technology. Learning physics with subjects related to the interested field of technology is the first step in engineering education. The fundamental educational contents for students and educational programs for science teachers include several topics in physics, from the simplest one to others. All subjects of the physics teaching process have been asked in order to obtain the traces of physics on students.

The perception level questionnaire has been applied to one hundred students from Electronics, Mechatronics and Computer Technologies departments of Tarsus Faculty of Technical Education which present a series of basic questions that reflects on the present situation of the teaching-learning relationship in physics.

All questions can be marked according to students' agreement on the questions in levels which correspond to their acceptance as; Strongly agree, agree, undecided, disagree, strongly disagree.

The first question asked to students is to evaluate the level of Physics lessons among other lessons. The responses of the students to this likert type question is given as a graph in figure 1.

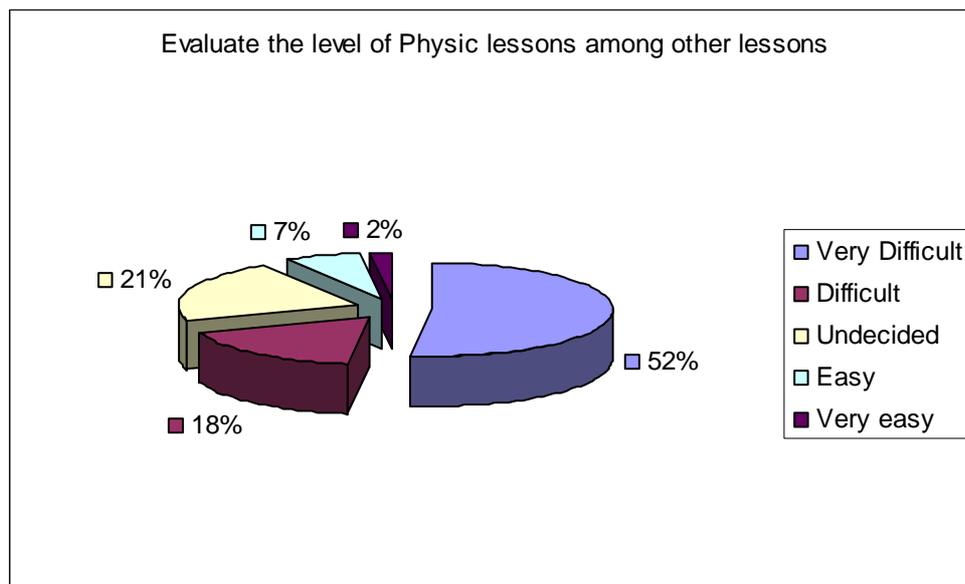


Figure 1: Evaluated level of Physics lessons among other lessons.

In figure 1, responses of students can vary from department to department. According to responses, 52% thinks Physics is very difficult to understand, 18% thinks difficult, 21%

undecided, however 7% of students think Physics is easy to understand and 2% thinks very easy. In the questionnaire, according to responses of students who have given as very difficult and difficult to first question have been asked to rate the subjects from easy to difficult in five scaling grades. The results are given in figure 2.

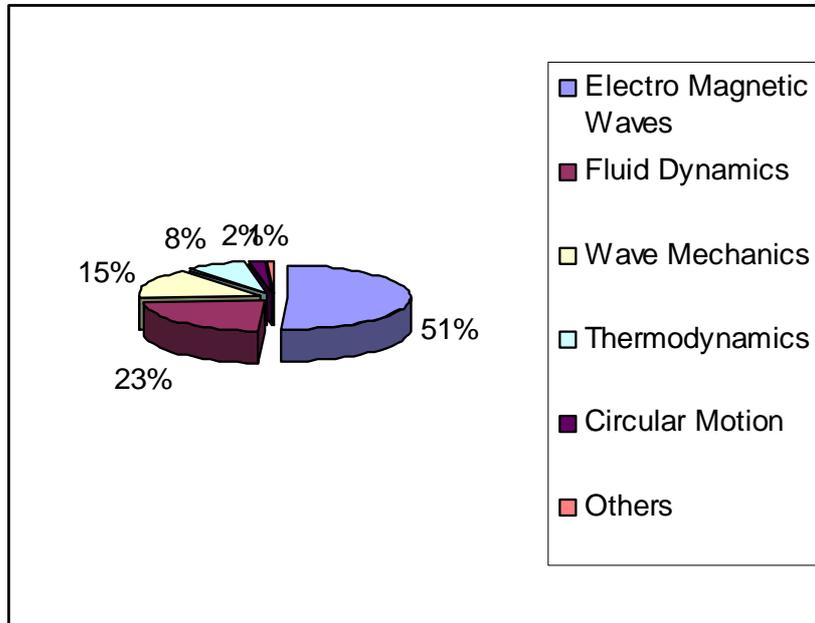


Figure 2. Most Difficult Physics subjects according to questionnaire.

In figure 2, Electro-Magnetic Theory subject of Physics is chosen to be the most difficult lesson. In the forms, there has been open ended questions to reveal the reasons of problems that cause failures in understanding process of physics.

The results of the open ended questions are given in figure 3.

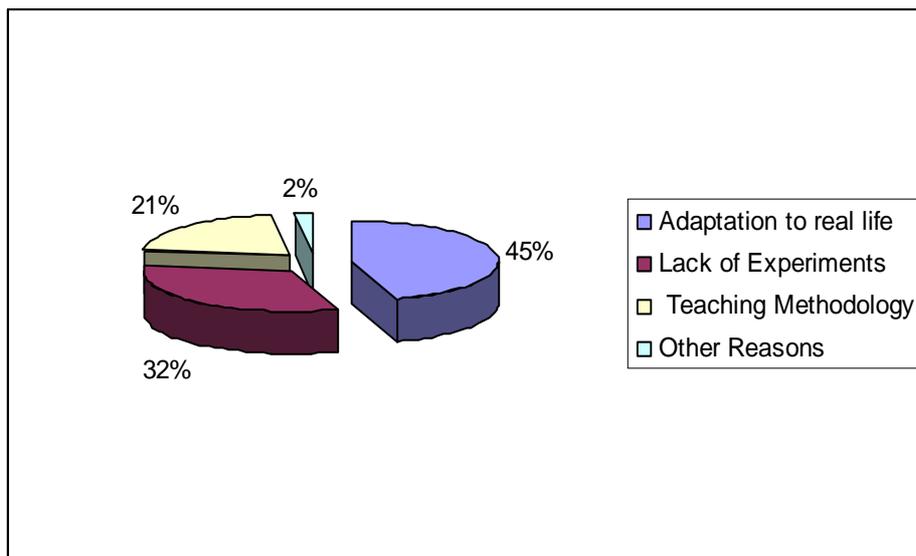


Figure 3. The reasons for failure in Physics Lessons.

As a result of applied open ended questions, the reasons of failures in physics lesson come out that students can not combine the physics rules with the real world and almost think they are separate. In the second rank, as a reason of the failure, lessons should be supported by experiments, if applicable. In the third rank, the failure is a result of wrong teaching methodologies and in the fourth rank, the reason seems to be teaching staff properties, gestures in teaching process.

CONCLUSION

The students are aware of the importance of Physics, however, as a result of questionnaire, they complain about the methodology of teaching process. The teaching methodology based on intense formula is refused by students. Student's would like to establish the knowledge of physics in connection with real life examples in their minds. Besides, Physics lessons must contain experimental sections in order to examine theories. Due to reasons of failure, physics lessons should be less formulated, less complicated in order to provide motivation on students. With the support of real life examples lessons may become more interesting.

References

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