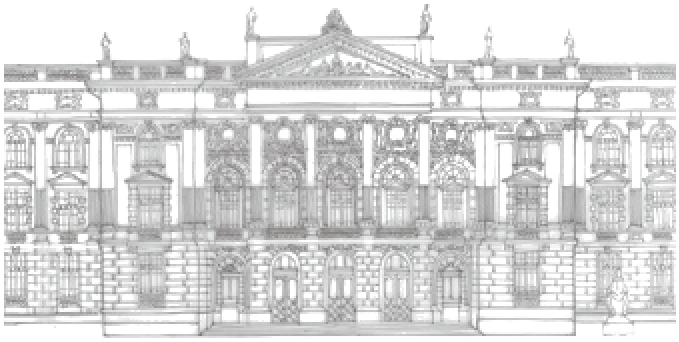
TEMPUS-TEHNICKI FAKULTETI-BEOGRAD

III. Savetovanje nastavnika o problemima nastave fizike na tehnickim fakultetima

Beograd 13.12.2003

(Svecana sala na Gradevinskom fakultetu, Bulevar kralja Aleksandra 73)

PROGRAM I POWER POINT PREZENTACIJA PREDAVANJA



Organizatori:
Contractor Tempus projekta ***CD_JEP-16123-2001***: UCL- London
Clanovi konzorcijuma: GF-Bgd, ETF-Bgd, TMF-Bgd, MF-Bgd, TU- Delft

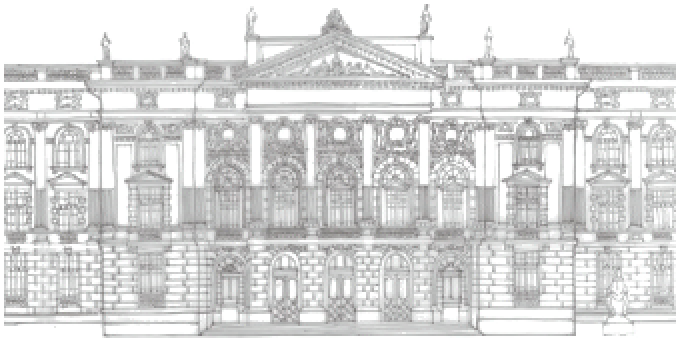
Kordinator Tempus projekata u SCG:
Tempus Office - Bgd

Organizatori:
Contractor Tempus projekta ***CD_JEP-16123-2001***: UCL- London
Clanovi konzorcijuma: GF-Bgd, ETF-Bgd, TMF-Bgd, MF-Bgd, TU- Delft

Organizacioni odbor:
dr Veljko Georgijevic, GF- Beograd
dr Božidar Stanic, ETF- Beograd
dr Konstantin Nikolic, UCL – London

Predavaci po pozivu:
dr Michael Forshaw, UCL- London
dr Veljko Georgijevic, GRF- Beograd
dr Božidar Stanic, ETF- Beograd
dr Jovan Cvetic, ETF- Beograd
mr Miodrag Malovic, GRF- Beograd
dipl. ing. Slobodan Babic, Kvark media- Beograd
dipl. ing.Vladimir Đordevic, ZFTF- Beograd

Koordinator Tempus projekata u SCG:
dr Stefan Dukiadjiev,Tempus Office-Bgd



PROGRAM

III. Savetovanje nastavnika o problemima nastave fizike na tehnickim fakultetima

(*Svecana sala na Gradevinskom fakultetu, Bulevar kralja Aleksandra 73*)

10.00 Otvaranje savetovanja

10.10 -10.30

dr Michael Forshow (UCL-London) *O razlozima za postojanje opštih predmeta na tehnickim fakultetima (The justification for teaching general studies, including physics, in technical faculties)*

10.30 - 11.15

dr Veljko Georgijevic (GRF- Beograd) *Priprema predloga novog zakona o Univerzitetu u Srbiji*

dr Jovan Cvetic (ETF-Beograd) *Stanje nastave fizike na prvoj godini studija na ETF-u*

dr Božidar Stanic (ETF- Beograd) *Uvodenje predmeta Fizika u informatici na Odseku za informatiku PMF UKM*

11.15 - 12.00 Pauza za kafu

12.00 - 14.00

mr Miodrag Malovic (GRF – Beograd) *Odredivanje ubrzanja, brzine i predenog puta pomocu akcelerometra*

dipl ing. Vladimir Đordevic (Zavod za fiziku TF-Bgd) *Odredivanje elementarnog naelektrisanja elektrona pomocu Hoffmannovog aparata*

dipl ing. Slobodan Babic (Kvark media- Beograd) *Mogucnosti primene racunara u nastavi fizike*

14.00-15.00 Zatvaranje savetovanja i koktel sa zakuskom

O razlozima za postojanje opštih predmeta na tehnickim fakultetima

(The justification for teaching general studies, including physics, in technical faculties)

Dr Michael Forshaw, UCL London

PATRIAM AMAMUS
EAM SERVABIMUS

We love our country -
we shall serve her

(and people are accustomed to the style of education that they learn as children and students)

Massachusetts Institute of Technology (MIT)

Electrical Engineering and Computer Science Department (EECS)

3, 4 or 5 year courses - power system engineering, high voltage research, chip manufacturing and design (VLSI), optics (laser, fibre optics), digital and analogue electronics design, image processing, data and video networks, the relation of electrical engineering to biology and medical applications, ……..

First year - four basic courses (not physics)

Electronics & Electrical Engineering

The mainstream Electronics and Electrical Engineering course is broadly based, so that the graduate engineer is able to deal with all aspects of the subject from power engineering to micro-electronics, and from radar installations to digital systems.

A degree in Electronics and Electrical Engineering will prepare students for a wide range of professional careers. Emphasis is placed on the understanding of fundamental principles and their application to design and the solution of practical engineering problems.

Even in early years of the course, when students are mastering relevant engineering science and mathematics, and being introduced to the principles of electronic circuits and systems, the focus is on using these skills to construct useful devices.

In later years, having gained experience in circuit and system design and the major application areas of control and communications, students can choose to acquire specialist knowledge in selected topics; from power engineering through applied neural networks and signal processing, to micro-, opto- and bio- electronics. In addition to state-of-the-art technical skills, the degree provides expertise in professional aspects including economics, project organisation and management; and considers environmental issues, including EMC, energy conservation, and safety.

Advances in the micro-electronic, opto-electronic and integrated circuit manufacturing industries are limited by the number of engineers available with expertise in solid state physics and its engineering applications. Graduates with this degree meet that need by combining a judicious balance of subjects from the Honours E&EE and Physics courses.

The Electronic Engineering and Physics degree produces graduates of high intellectual quality, having a broad range of knowledge and skills in physical electronics; in particular in relation to theory and practice in the field of semiconductors and optoelectronics. Students gain fundamental understanding, and practical knowledge of electrical circuits, electronic devices, elementary mechanics, electromagnetics, quantum mechanics and semiconductor physics, and in later years apply this understanding to the analysis and design of semiconductor devices such as field effect transistors, LEDs and semiconductor lasers and to the systems in computing and communications which use these devices.

It is expected that students will be able to undertake a significantly greater mathematical curriculum than that for Single Honours E&EE, and that students are likely to graduate with a high Honours Classification which will qualify them for state-of-the-art research, development, or design laboratories in academia or industry

GLASGOW UNIVERSITY

Year	Year 1	Year 2	Year 3	Year 4	Year 5
M.Eng	Electronic Engineering, Engineering Mathematics, Physics				
	Electronic Design Project Analogue Electronics, Digital Electronics, Electrical Circuits, Mathematics, Physics				
		Team Design Project Physics, Comms. Systems, Electronic Circuit Design, Electronic System Design, Silicon Device Technology Physics			
			Two course options from 4th Year Options.		
				Language Course, Project Management, Supply Chain Logistics *European Industrial Project* Industrial Management, Marketing, Management & Organisation	
B.Eng. (Honours)			As above	As M.Eng with Management courses replaced by; Individual Project & Additional course choices.	

Department of Electronic & Electrical Engineering
University College London

Degree Programme	Degree	Length	UCAS Code
Electronic and Electrical Engineering	**BEng**	3 years	**H600**
Electronic and Electrical Engineering	**MEng**	4 years	**H601**
Electronic and Electrical Engineering (International Programme)	**MEng**	4 years	**H605**
Electronic Engineering with Communications Engineering	**MEng**	4 years	**H613**
Electronic Engineering with Computer Science	**MEng**	4 years	**H6G4**
Electronic Engineering with Management Studies	**MEng**	4 years	**H6N2**

All the degree programmes (except H605) have a common first and second year which cover the fundamental material of the degree, followed by specialisation in the third and fourth years according to the particular degree

First Year Second Year Third and Fourth Years

Computer Architecture 1
Electronic Circuits I
Circuit Analysis and Synthesis I
Digital Circuits
C Language Programming
Electromagnetics
Mathematics for Electronic Engineers I
Communications Systems I

Common for all first year programmes (with the minor exception of H605 where a half course unit in a relevant language may replace Computer Architecture I).

University of Loughborough

Mechanical and Manufacturing Engineering

This programme of four academic years allows high calibre students to further develop their understanding of the role of Mechanical Engineering in the industrial context. The first two years are common to the BEng structure. In the third and fourth academic years, the MEng programmes provide enhanced opportunities to study your chosen specialist subjects in depth. In addition, MEng students follow extra courses in practical business management, design and microprocessor control systems, and are offered the chance to study a European Language.
The MEng programmes are the preferred route to achieving Chartered Engineer status.

Years 1 and 2
Dynamics * Mathematics * Statics and Mechanics of Materials * Engineering Mechanics * Thermodynamics * Business, Finance and Law * Heat Transfer * Fluid Mechanics * Industry Design Project.

The University of Oxford

Mathematical and Physical Sciences Division

Mathematical Sciences

Computing Laboratory
Mathematics
Statistics

Physical Sciences

Chemistry
Earth Sciences
Engineering Science
Materials Science
Physics

Engineering at Oxford

The Department of Engineering Science at Oxford is a unified department, covering all the important engineering disciplines in a single departmental structure within the faculty of Physical Sciences. There is ample evidence that employers welcome the versatility which our graduates have acquired from their general training in the first half or so of their courses; undergraduates, for their part, benefit from first-hand knowledge when choosing specialized options in the later stages, which take them to the leading edge of the profession.

The Engineering Science Course (Oxford)

The First Year

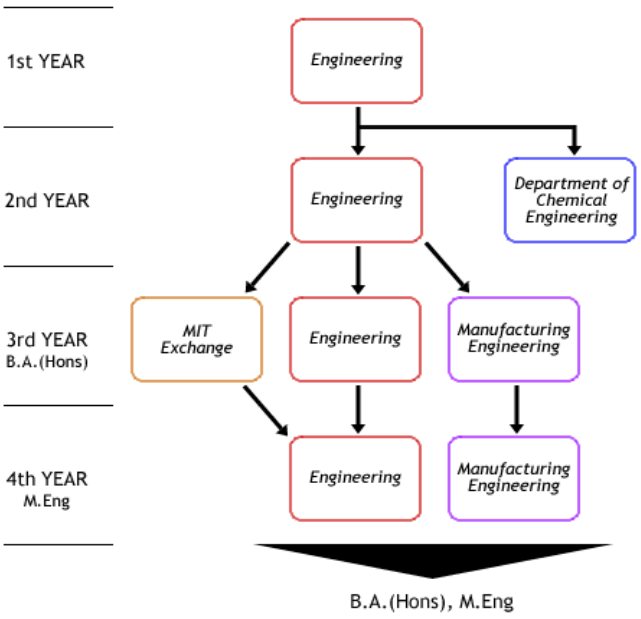
The first year is common to all four engineering courses. Part of the year revises, and presents in new ways, aspects of the mathematical and physical foundations of engineering which will be familiar to you from school. In addition, topics more specific to engineering are introduced, such as structures, fluid mechanics, material properties and digital systems, to prepare you for later specialisation in one or more branches of engineering.

You are also introduced to practical work. Structured laboratory work complements lectures in all the key course areas, introducing you to sound engineering practice. You will also be introduced to the important idea of engineering design, build and test, with three projects in the following areas:

- **structural and mechanical engineering**
- **electrical engineering**
- **computing**

In these projects, you have a single product goal but must make your own design decisions.

CAMBRIDGE University Engineering Department



The first two years of the Engineering Course at Cambridge are basically the same for all students and aim to give a broad overview of the subject, covering mechanical and structural engineering as well as materials, electrical and information engineering.

In addition to the formal lecture courses, a number of external and internal speakers are invited during the year to give 'Engineering Applications' lectures which will keep you in touch with industrial and research aspects of the subject.

Engineering mathematics is also taught in these two years, but as two different courses to accommodate both those who started the course having done single Maths at A-level as well as those who have had the opportunity to take Further Maths. In engineering, mathematics is used as a tool for describing physical phenomena and behaviour, so the teaching approach is very different from that used for mathematicians studying the subject as a purely intellectual discipline.

All students take the same four examinations at the end of their first year:

1. Mechanical Engineering
2. Structures and Materials
3. Electrical and Information Engineering
4. Mathematical Methods

“A rose

by any other name

smells just as sweet”

(William Shakespeare)

(and physics is still physics, even if it is taught as part of mechanical engineering, or electrical engineering, or civil engineering, or …..)

PRIPREMA PREDLOGA NOVOG ZAKONA O UNIVERZITETU U SRBIJI

Dr Veljko Georgijevic, GRF Beograd

HRONOLOŠKI PREGLED

1. Vlada je potpisla Deklaraciju sredinom septembra. U Evropi nije potpisala samo Belorusija
2. Ministartsvo pustilo Nacrt zakona u javnu diskusiju 1.10.03.
3. BU 25.10.03. podneo predlog izmena i tražio produženje diskusije za mesec dana
4. Usaglašavanje još traje. Položaj Vlade oslabio zbog raspuštanja Skupštine

TEMPUS - TEHNICKI FAKULTETI

SUŠTINA BOLONJESKE DEKLARACI JE JEDNOSTAVNA: unifikacija visokoškolskog prostora u EU na sledecim principima

1. 3+2+2 ili nešto slicno (4+1+2)
2. Mobilnost: (a) studenti, (b) nastavnici
3. Kreditni nacin ocenjivanja (ECTS)
4. Jedinstveni kriterijumi kvaliteta

TEMPUS - TEHNICKI FAKULTETI

BD može da se uvede na razne nacine i tu se javlja razlika izmedu MIN i BU

1. MIN predlaže znatno smanjenje ingerencija fakulteta (narocito u pogledu upravljanja finansijama, ali i drugo)
2. BU odbija da to prihvati i daje protivpredlog kojim pokušava da ocuva dosadašnji profil u što vecoj meri
3. Usaglašavanje izmedu MIN i BU je još u toku

MOGUCE POSLEDICE

1. Ako pretegne predlog MIN, BU bi mogao da reaguje formiranjem manjih univerziteta (Tehnicki, itd)
2. Ako pretegne predlog BU, BU bi mogao da opstane u približno u današnjoj formi

AKO SE FORMIRA TU U BEOGRADU

1. Moguc je prelaz na zajednicke katedre (Fizika, Matematika, Nacrtna geometrija, Mehanika, Društvene nauke, Strani jezici)
2. Takva vrsta ishoda nije iskljucena cak i ako se prihvati zakonska koncepcija BU
3. U takvim okolnostima ZF postaje utocište fizicara ovdašnjih tehnickih fakulteta

Stanje nastave fizike na prvoj godini studija na ETF-u

dr Jovan Cvetic, ETF - Bgd

- Dvosemestralni kurs fizike je podeljen na dva jednosemestralna kursa: Fizika I i Fizika II

- Delimicno izmenjeni programi kurseva

- Kursevi su zadržali isti broj casova (3P+2V)

- Kurs Fizike I obavezan za sve studente (odseci RT i OSO) u prvom semestru

- Eksperimentalne vežbe iz fizike I su poseban kurs (2L), obavezan za sve studente u prvom semestru

- Kurs Fizike II je izborni u drugom semestru samo za studente OSO

- Eksperimentalne vežbe iz fizike I su poseban kurs (2L), obavezan za sve studente u prvom semestru

- Eksperimentalne vežbe iz fizike II su poseban kurs (2L), izborni za sve studente u drugom semestru

Kurs fizike I

- Polaganje ispita preko dva parcijalna ispita (na sredini i na kraju zimskog semestra)

- Parcijalni ispiti traju 4h, broj zadataka 5(6), 3(4)+2

- Na svakom parcijalnom ispitu se daju i pitanja iz teorije, nema posebnog usmenog dela ispita

Program kursa fizike I

- **Kinematika tacke i krutog tela**
- **Dinamika materijalne tacke**
- **Rad, snaga i energija**
- **Dinamika sistema materijalnih tacaka**
- **Ravansko kretanje krutog tela, translacija, rotacija i složeno kretanje**
- **Oscilatorno kretanje**
- **Elasticnost**
- **Mehanicki talasi**
- **Gravitacija**
- **Osnovi kineticke teorije gasova**
- **Osnovi termodinamike**

UVOĐENJE PREDMETA

FIZIKA U INFORMATICI

NA ODSEKU ZA INFORMATIKU PMF U KOSOVSKOJ MITROVICI

Dr Božidar V. Stanic, ETF Beograd

- Ubrzani razvoj NP
- Nova zgrada koja se dobro održava
- Studenti sa bedževima
- Evropsko održavanje WCa
- Kompjuterska ucionica sa 25 PC

Broj studenata : 33

U prvom semestru nema nastave iz Osnova elektrotehnike i Analize.

Iz matematike se uci samo linearna algebra.

Program: 1. semestar (3+2)

- Elementi vektorske algebre.
- Izvodi i integrali i njihova fizicka interpretacija. Brzina ubrzanje, rad i snaga. Kineticka i potencijalna energija.
- Diferencijalne jednacine prvog i drugog reda.
- MathCad paket.

- Elektricno, magnetsko i gravitaciono polje.
- Skretanje elektrona u elektricnom i magnetskom polju. CRT monitor.
- Kretanje i parametri telekomunikacionih satelita.
- Lokalni Ohmov zakon. Elektromagnetska indukcija. AC i DC generator i motor.
- R, L i C parametri kola. AC elektricna kola. NF i VF filtri. Transformatori, ispravljaci i stabilizatori. Napajanje racunara.
- Provodenje i konvekcija toplote. Hladenje racunara.
- Prenos signala po elektricnim vodovima i optickim vlaknima.

- Fizika i tehnika poluprovodnika. Bohrov model atoma H i diskretni energijski nivoi. Zonalni model elektrona u kristalima.
- p i n materijali i njihove karakteristike. Provodenje i difuzija elektrona i šupljina. Ajnštajnova relacija Fermijev nivo.
- P-N spoj i poluprovodnicka dioda.
- Bipolarni tranzistori i FET-ovi. Osnovna kola.
- Princip rada lasera i karakteristike svetlece diode (LED) i laserske diode (LD).

- Stimulisana poseta predavanjima i vežbama (Max 10% konacne ocene)

- Domaci zadaci (Max 10% konacne ocene)

- Opšta informisanost
- test iz opšte informisanost sredinom semestra (15 min za 30 test pitanja)
- test iz opšte informisanosti krajem semestra (15 minuta za 30 test pitanja)
- Uspeh od -3% do max 10% konac. ocene

1) ***AC*** (***A***lternating ***C***urrent) je:
a) promenljiva struja , b) jednosmerna stuja,
c) naizmenicna stuja

2) ***Attenuation*** je:
a) pojacanje, b) slabljenje , c) ispravljanje

3) ***Velocity*** je:
a) brojna vrednost brzine, b) vektor brzine,
c) vektor ubrzanja

4) ***Dot product*** je:
a) mešoviti proizvod, b) vektorski proizvod,
c) skalarni proizvod

5) ***Calculus*** je:
a) algebarski racun, c) matricni racun,
c) diferencijalni i integralni racun

6) **OEM** (***O***riginal ***E***quipment ***M***anufacturer) je skracenica za:
a) proizvodac originalne opreme,
b) originalni proizvod,
c) zamena za original

Kolokvijumi:

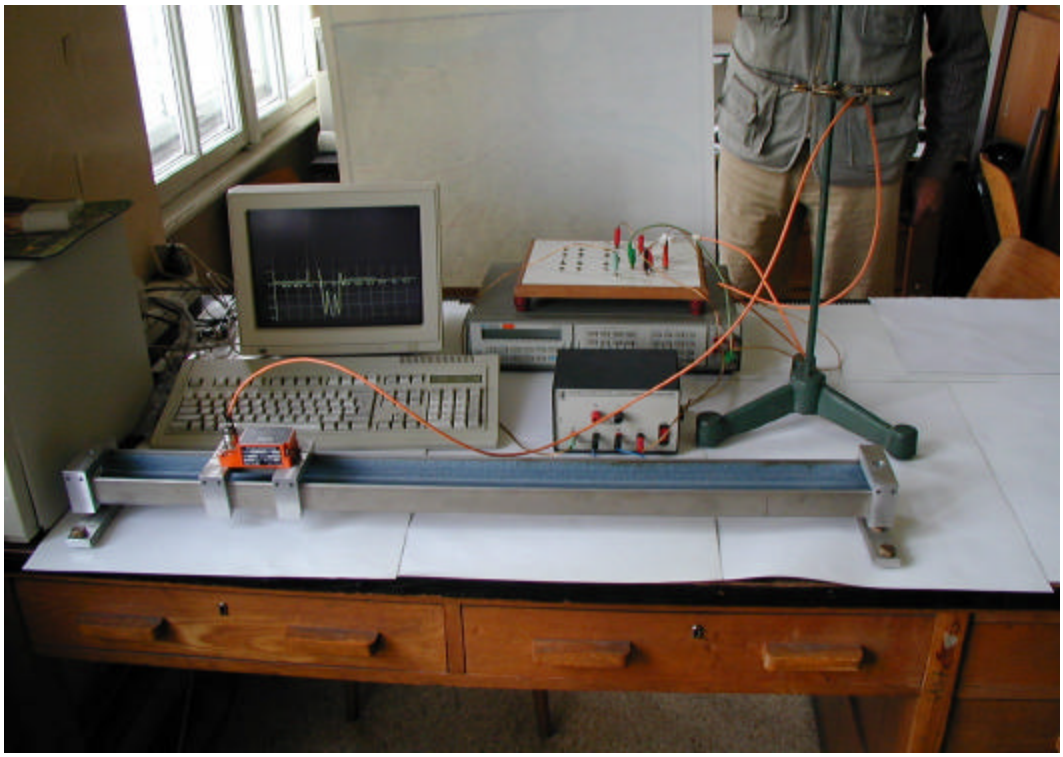
- 1. na sredini semestra (17.5%),
- 2. na kraju semestra (17.5%),
- završni pismeni ispit (35%)

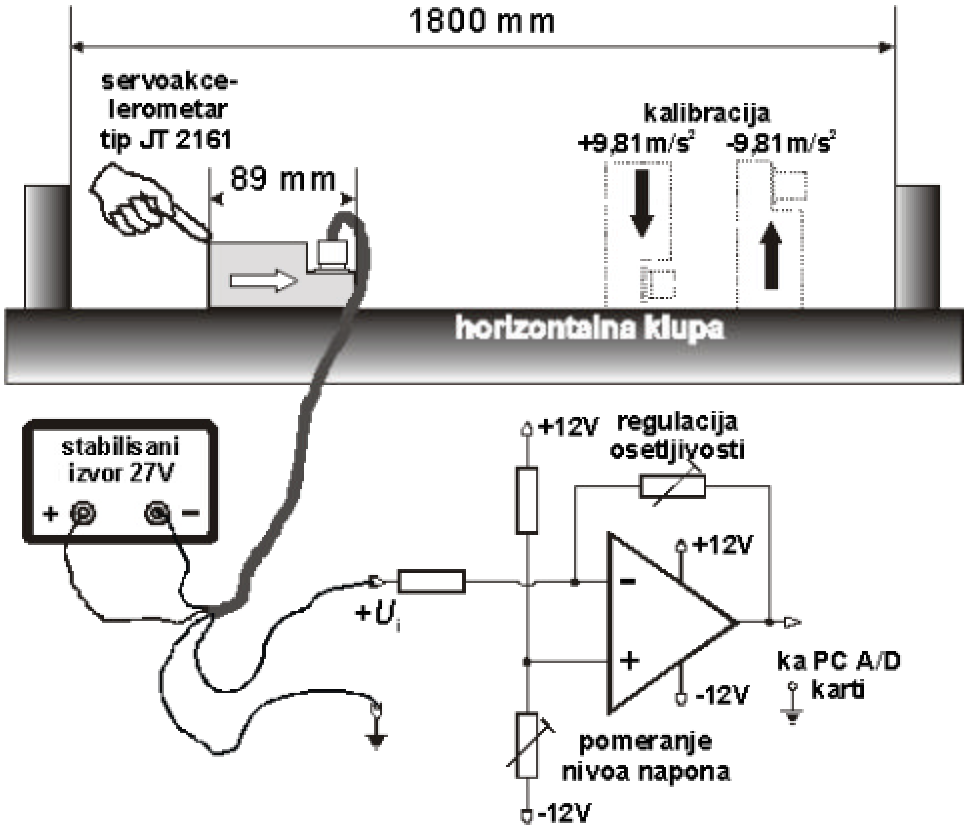
Krajnja ocena:

- KOC = 0.1(P0SETA%) + 0.1(DOMACI ZADACI%) + 0.1(OPSTA INFORMIS.%) + 0,175(1.KOLKOVIJUM%) + 0.175(2. KOLOKVIJUM%)+ 0.35(ZAVRŠNI ISPIT%).

Odredivanje ubrzanja, brzine i predenog puta pomocu akcelerometra

mr Miodrag Malovic, GRF- Beograd

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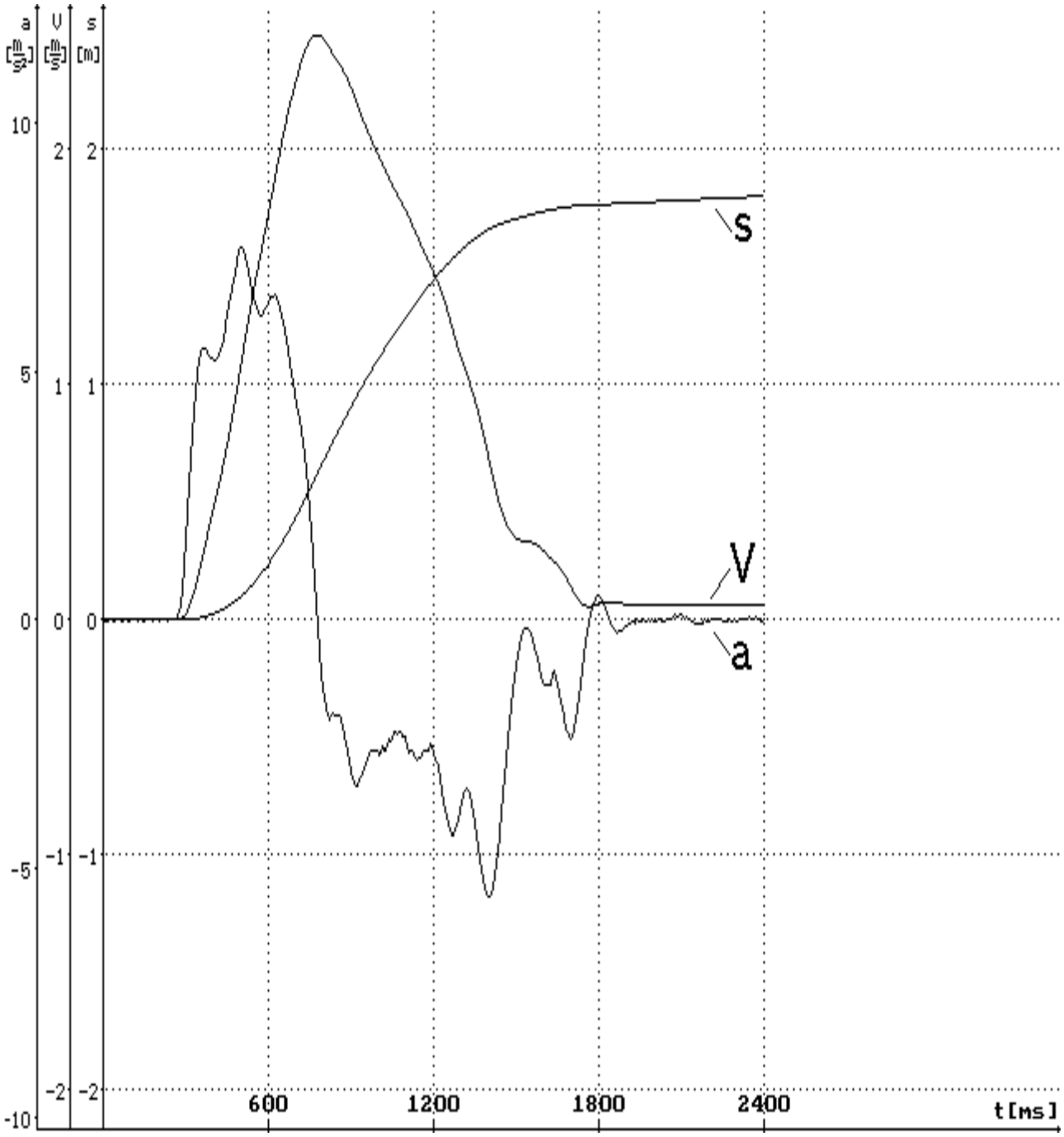
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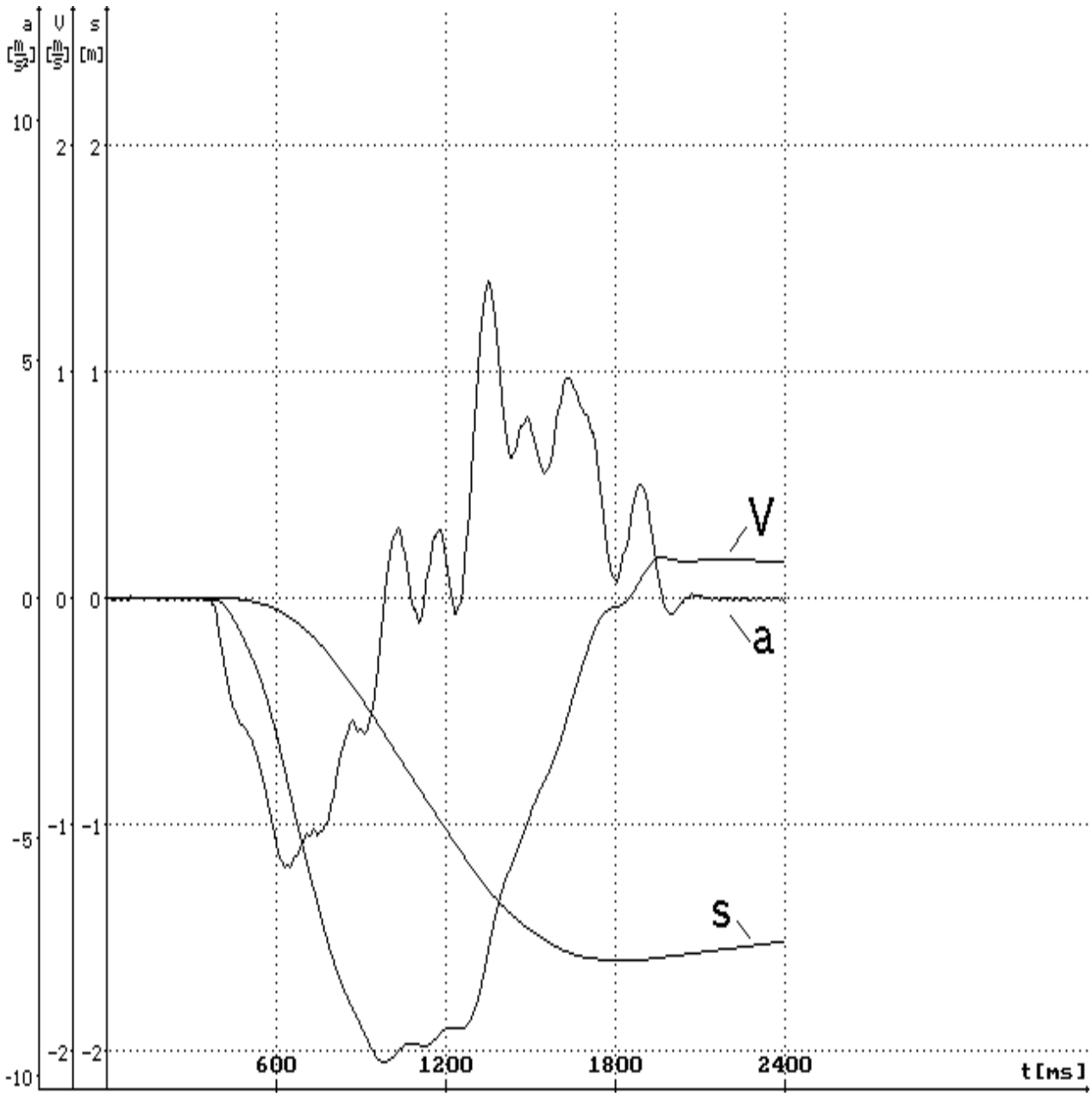
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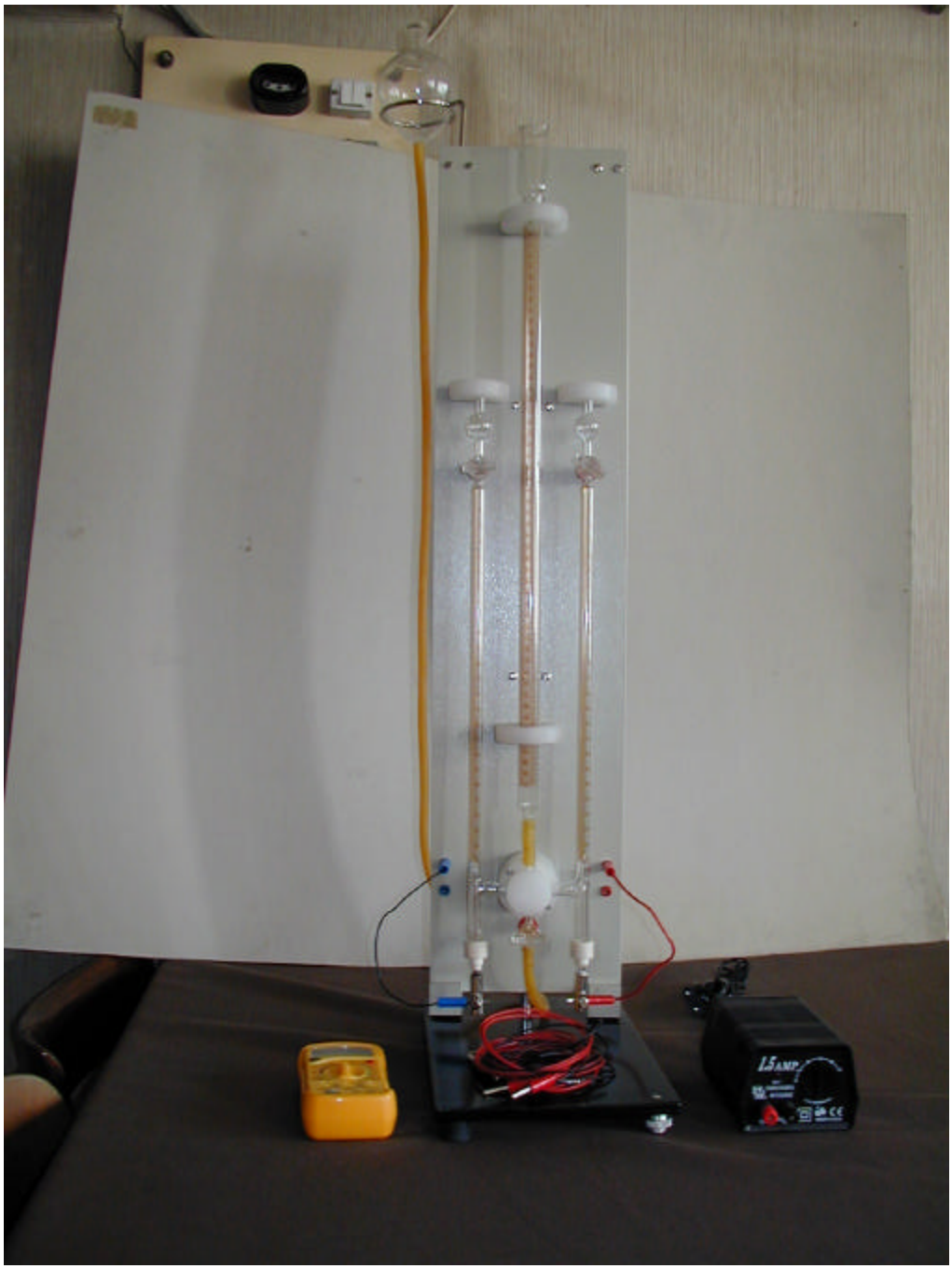
Odredivanje elemetarnog naelektrisanja elektrona pomocu Hoffmannovog aparata

dipl ing Vladimir Đordevic, ZFTF- Beograd



- Prvi Faradejev zakon
- Drugi Faradejev zakon
- Hemijski ekvivalent A/z
- Elektrohemijski ekvivalent k elementa **k=(1/F)(A/z)**
- A atomska masa elementa
- z valentnost elementa
- Faradejeva konstanta F
- m masa jednog atoma

$k = m/ze$

$e = F/(A/m) = Q/N = F/N_0$

- **konstantne velicine**
  N_0 , p_0 , T_0 , V_m

- **Merene velicine: I, t ,V**

- **$p = p_0 + p_1 - p_2$**

$$e = \frac{(It)}{2N_0} \cdot \frac{p_0}{p} \cdot \frac{T}{T_0} \cdot \frac{V_m}{V}$$

$$\frac{p}{p_0} = \frac{h_0}{h_0 + \frac{h}{(\frac{r}{r_0})} - h_2}$$

Mogucnosti primene racunara u nastavi fizike

dipl ing Slobodan Babic, Kvark media- Bgd

Ucesnici na trcem savetovanju nastavnika fizike:

Anovski Todor
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Republika Makedonija
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fax:++ 389 2 365 389
e-mail: anovski@unim.edu.mk

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e-mail: kvark@eunet.yu

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Fakultet tehnickih nauka
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tel. 028/423-127
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