

EDUCATION QUALITY IMPROVEMENT
BY E-LEARNING TECHNOLOGY

EOLIBELT

WORKSHOPS 2007-2008
PROCEEDINGS

3rd

POLICY WORKSHOP ON PEDAGOGICAL OPPORTUNITIES OF E-LEARNING

Zagreb, October 25-26, 2007

2nd

WORKSHOP ON EARNING SUPPORT CENTERS

Zagreb, April 2-4, 2008

WORKSHOP ON COURSE DEVELOPMENT IN E-LEARNING ENVIRONMENT

Rijeka, September 25-26, 2008



Tempus



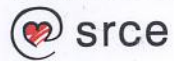
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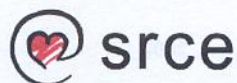
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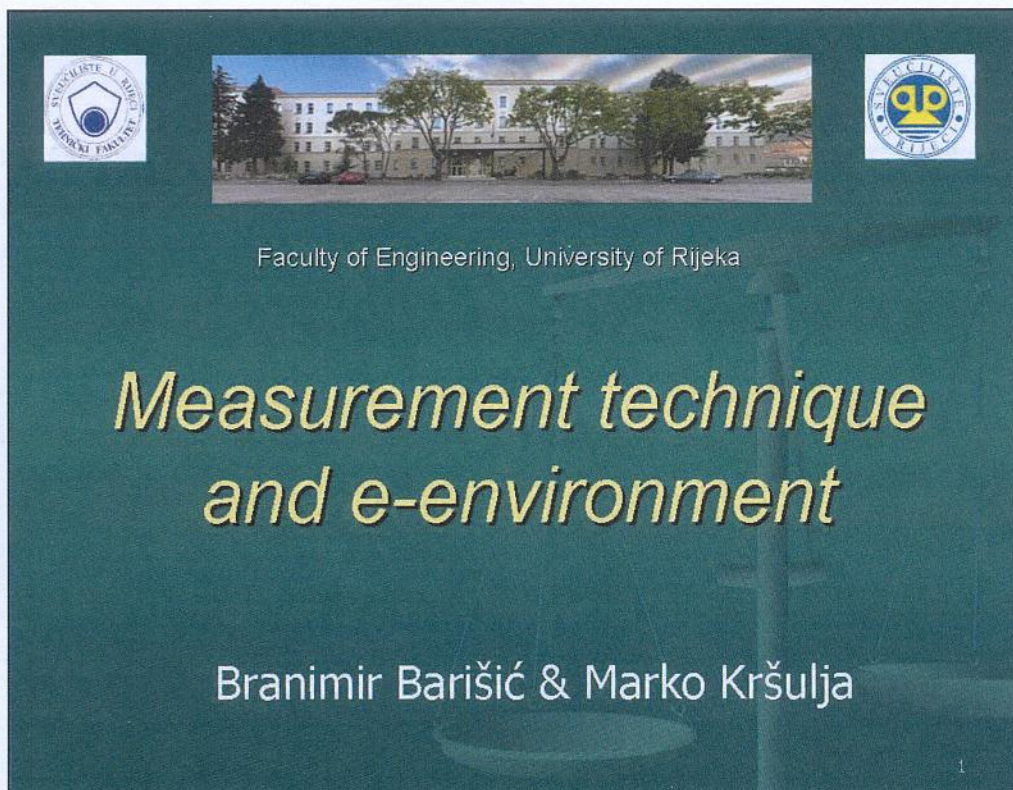
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Zagreb, January 2009

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4.2.10. BRANIMIR BARIŠIĆ & MARKO KRŠULJA: MEASUREMENT TECHNIQUE AND E-ENVIRONMENT



Faculty of Engineering, University of Rijeka

*Measurement technique
and e-environment*

Branimir Barišić & Marko Kršulja

1

In our e-learning education the distance learning system Merlin has been chosen. Merlin provides platform for e-learning which is free for academic society. In this system as the Learning Management System (LMS) the Moodle is used.

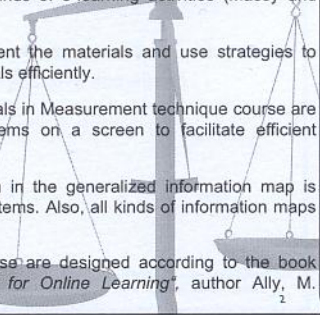
Measurement technique course is based on blended e-learning model (applications) and course use all 4 kinds of e-learning activities (Massy and Zemsky).

Online learning strategies must present the materials and use strategies to enable students to process the materials efficiently.

Because of that online learning materials in Measurement technique course are presented between five and nine items on a screen to facilitate efficient processing in working memory.

As the lesson progresses, each item in the generalized information map is presented and broken down into sub-items. Also, all kinds of information maps are used in on line teaching materials.

Online learning materials in this course are designed according to the book "Foundations of Educational Theory for Online Learning", author Ally, M. (2005), Athabasca University Press.



Merlin course page for 'Mehanika I' (Mechanics I). It lists the course title, instructor (Prof. dr. sc. Branimir Barišić), and a list of learning objectives for various topics like statics and dynamics.

Merlin course page for 'MEHANIKA I' (Mechanics I). It shows the course title, instructor information, a calendar for the semester, and a list of course topics including statics, dynamics, and vibrations.

Merlin course page for 'MEHANIKA I' (Mechanics I) showing a list of laboratory exercises (laboratorijske vježbe) and their objectives, such as measuring moments of inertia and studying pendulum oscillations.

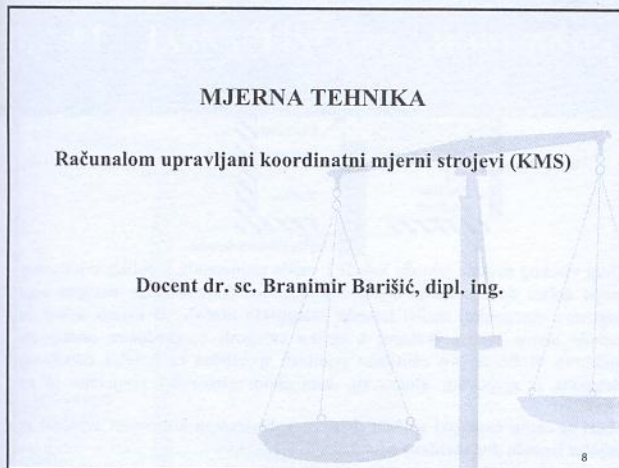
Merlin course page showing a detailed monthly calendar for October 2008. It lists dates, days of the week, and specific course activities or events for each day.

Merlin course page showing a detailed monthly calendar for October 2008, similar to the previous one, but with a different layout for the calendar grid and event listings.

MJERNA TEHNIKA


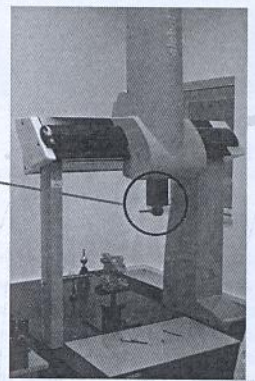
Računalom upravljani koordinatni mjerni strojevi (KMS)

Docent dr. sc. Branimir Barišić, dipl. ing.




8

Prikaz koordinatnog mjernog stroja i njegove mjerne glave:

Slijedi film 3D mjerenje kućišta vijčanog kompresora (Volkswagen Touarega)


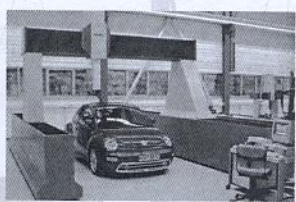


9

Osnovni princip rada se sastoji u identificiranju koordinata položaja točaka, crta i površina. Preko izmjerenih koordinata, računalnim putem stvara se numerička slika površina koje formiraju objekt.

Raspored i broj mjernih točaka na površinama mjerenog objekta ovisi o obliku i položaju površine i tražene točnosti mjerenja.

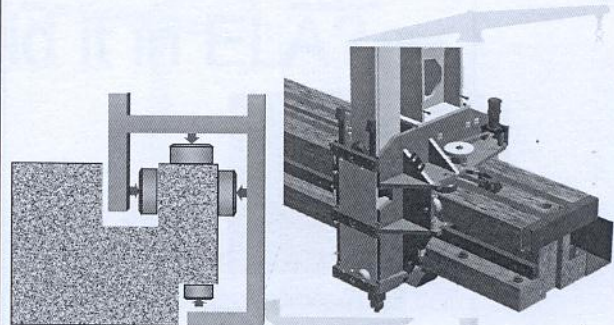
Minimalni broj točaka određen je matematičkim zakonitostima kojima je definirana numerička slika površine-za crtu najmanje dvije točke, za krug tri, za površinu tri nekolinearne točke. Točniji oblik i položaj uvijek se dobije na osnovu većeg broja mjernih točaka.

10

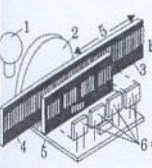
Vođenje KMS

Ostvaruje se pomoću zračnih ležajeva koji su pozicionirani na 4 strane za vođenje na nemagnetičnom, otpornom na koroziju, poliranom granitu.



11

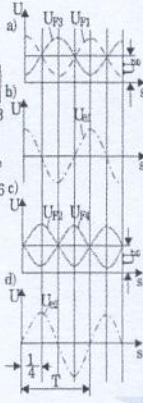
Mjerna princip



Svjetlosni izvor (1) preko objektivna (2) usmjerava svjetlost kroz nepokretni element (3), koji sadrži rešetke različite gustoće (4), i kroz pokretni rešetkasti element (5) na fotočelije (6). Pravocrtno gibanje pokretnog elementa (3) daje promjenu jačine svjetlosti ili svjetlosnog fluksa prije ulaska u fotočeliju. Dakle, gibanjem elementa (5) zatvaraju se i otvaraju prolazi svjetlosnom snopu, pa se jačina svjetlosti mijenja po sinusnom zakonu. Pomoći fotočelije (6) jačina svjetlosti pretvara se u električne signale. Dakle, naizmjenično osvjetljavanje u ritmu promjene jačine svjetlosti fotočelija transformira u pulsirajuću struju tj. električne signale.

$U_{e1} = U_{F1} - U_{F3}$

$U_{e2} = U_{F2} - U_{F4}$




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MJERNA TEHNIKA

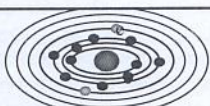
Mjerenje kemijskog sastava materijala pomoću optičke atomske spektroskopije

Docent dr. sc. Branimir Barišić, dipl. ing.



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OSNOVNI POJMOVI



SPEKTROSKOPIJA

bavi se interakcijama između materijala i elektromagnetnih zračenja.

SPEKTROMetriJA

bavi se kvantitativnim mjerenjem intenziteta elektromagnetnih zračenja.

FIZIKALNI PRINCIP

Elektroni se unutar atoma nalaze na određenim energijskim nivoima.

Gibajući se između ovih nivoa elektroni mogu apsorbirati ili emitirati energiju jednaku razlici između ovih nivoa. U optičkoj spektroskopiji energija apsorbirana za prijelaz na viši energijski nivo ili emitirana za niži energijski nivo je obliku fotona (čestica svjetlosti). Valna duljina ovih fotona može odrediti identitet atoma (tj. kemijski element kojem pripada atom). Broj fotona te valne duljine direktno je proporcionalan koncentraciji tog elementa u uzorku.

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PRINCIP RADA SPEKTROMETRA



Zbog visokog napona između katode i anode usmjerenog u obliku svjetlosnog snopa dolazi do apsorpcije dijela ove svjetlosti (svjetlost ima energiju koja odgovara energetskej razlici između energijskih nivoa). U katodi dolazi do uzbude atoma metala (katode) u obliku svjetlosti s određenim emisijskim spektrom. Količina ove emitirane svjetlosti specifična za prijelaz određenog elektrona u njegovom atomu (tj. kemijskom elementu) izmjerena je na detektoru.

Mjeri se samo emisijski spektar dobiven kalibriranom količinom svjetlost za prijelaz između dva utvrđena energijska nivoa.

15

Prikazati simulaciju emisijskog svjetla iz softvera!!!!



Izgled spektrometra

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**THANK YOU FOR
ATTENTION
QUESTIONS AND
ANSWERS**

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