

The Name of the Institution:

*Faculty of Electrical Engineering,
University of Belgrade*

<i>Description of an Individual Course Unit</i>							
Course Code:	OG4PDU	Level of Course:	Undergraduate	ECTS	3	Semester	8
Course Title:	Practice Digital Signal Processors			Year of Study:		4	
Prerequisites:	None			Type of course:	Optional		
Lecturer(s):	Prof. Dr. Slobodan N. Vukosavić						
Course Staff:							
Objective of the course:	<p>Introduction to practical implementation of digital controllers on DSP platforms. Review of hardware and software aspects.</p> <p>DSP programming in assembly language. C compilers for DSP platforms. Accessing Harvard architecture resources from C. The use of code generators and simulators.</p> <p>Provide students with the ability to design and implement digital controllers and signal processing solutions on DSP platforms. Verification and reliability issues. Basic aspects of software documentation.</p>						
Course Contents:	<p>The architecture and peripheral units of DSP. MAC instructions and mechanisms, auxiliary register addressing, bit direct and bit inverse addressing. Specialized DSP units for motion control and servo motor control applications.</p> <p>Code development and debugging tools. Code Composer Studio. Code simulation tools. Implementation issues on fixed and floating point architectures. Q-formats. Implementation of control algorithms and digital filters in assembler.</p> <p>Implementation in C programming language. Operation and register usage and stack development with C compilers for DSP platforms. Known problems in using Harvard architecture features in C environment, exceptions. Using MACD, NORM, TBLW, SUBC, table read and bit reversed addressing in C environment. Solutions and examples. Matrix multiplication chains. Practical issues with coding the FFT on DSP platforms.</p> <p>Implementation of discrete time speed and position controllers. Interpolation and microinterpolation. Pseudoinversion routines. Practical aspect of deriving the matrix singular values. Numerical issues with system identification and known solutions.</p> <p>The use of code generators. .</p>						
Teaching Methods:	10 hour of lectures and 20 hours of practical exercises in computer classroom. Additional 15 hours of personal study, exercise and homework.						
Literature:	<ol style="list-style-type: none">1. S.N. Vukosavić: "Digital Control of Electrical Drives"2. Texas Instruments: "Digital Signal Processing in VLSI"3. Uputstvo za laboratorijske vežbe iz MPEMP, ETF Beograd, ddc.etf.bg.ac.yu						
Assessment methods:	Periodic progress assessment during the course, complimented with homework. A, B or C grades concluded at the end of the course.						
Language of instruction:	Serbian	Date:	20.12.2005	Signature:			

Ime institucije:

*Elektrotehnički fakultet,
Univerzitet u Beogradu*

<i>Informacije o predmetu</i>							
Šifra kursa:	OG4PDU	Nivo kursa:	Osnovne studije	ESPB	3	Semestar:	8
Naziv kursa:	Praktikum: Digitalni signalni procesori			Godina studija:		4	
Preduslovi:	-			Tip kursa:	Izborni		
Predavač(i):	Prof. dr Slobodan N. Vukosavić						
Saradnici:							
Ciljevi kursa:	<p>Upoznavanje sa praktičnim aspektima implementacije upravljačkih algoritama na platformama sa digitalnim signalnim procesorima. Pregled hardverskih i programskih aspekata implementacije.</p> <p>Programiranje DSP u assembleru. C kompajleri za DSP i problemi korišćenja resursa Harvardske arhitekture u C-u. Korišćenje kod generatora i simulatora.</p> <p>Osposobljavanje studenata za projektovanje i praktičnu implementaciju algoritama upravljanja na DSP platformama. Aspekti verifikacije, osiguranja pouzdanosti koda i dokumentacije.</p>						
Sadržaj kursa:	<p>Arhitektura i osobine DSP, MAC instrukcije i mehanizmi, pomoćni registri DSP, bit inverzno i direktno adresiranje. Specijalizovani procesori za upravljanje kretanjem i upravljanje električnim servo motorima.</p> <p>Alati za razvoj i ispitivanje koda. Code Composer Studio. Korišćenje simulatora. Implementacije zasnovane na centralnim jedinicama sa fiksnim i pokretnim zarezom. Q-formati. Programiranje karakterističnih algoritama za obradu signala u assembleru.</p> <p>Primeri programiranja DSP u programskom jeziku C. Izuzeci. Korišćenje MACD, NORM itd. u C-okruženju. Rešenja, primeri. Množenje vektora i matrica. Primer praktičnog kodiranja FFT .</p> <p>Programska realizacija regulatora brzine i pozicije. Interpolacija. Programska realizacija pseudoinverzije. Praktična rešenja za određivanje singularnih vrednosti matrice u realnom vremenu. Drugi problemi identifikacije.</p> <p>Korišćenje kod-generatora.</p>						
Metodi predavanja:	10 časova predavanja + 20 časova praktičnih vežbi na računaru, uz dodatak 15 časova samostalnog učenja i vežbanja.						
Literatura:	<ol style="list-style-type: none">1. S.N. Vukosavić: "Digital Control of Electrical Drives"2. Texas Instruments: "Digital Signal Processing in VLSI"3. Uputstvo za laboratorijske vežbe iz MPUEMP, ETF Beograd, ddc.etf.bg.ac.yu						
Metodi ocenjivanja:	Provera znanja u toku izvođenja kursa i kroz domaće zadatke. Po okončanom praktikumu, formuliše se opisna ocena u tri nivoa gradacije.						
Jezik nastave:	Srpski	Datum:	20.12.2005	Potpis:			