

Branch Name:	Signal Processing and Communication
Program Code:	ET214
Course Name:	DSP System Design
Course Code:	2ET2140106T
Pre-requisite Subject	Signals & Systems, Digital Signal Processing

Course Objective:

1. To study the course focuses on the basis processing applications that concerns present and future dynamic TMS320C6713 platform.
2. To study and introduce important applications on FIR, IIR, FFT, voice, audio, image.
3. To study the application, standards and advanced topics of digital signal processors of Texas platform.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40		-	-	-	100

Subject Contents

Sr. No	Topic	Total Hours	Weight (%)
1	Introduction to a popular DSP from Texas Instrument: Over View of Texas instrument DSP process or Families TMS320C2000, TMS320C5000 and TMS320C6000 and its various fields Of applications.	5	10
2	Digital Signal Processor TMS320C6713: Features, CPU block diagram, registers, pipelining, CPU data paths and control, Instruction set and addressing mode, Internal data/ Program memory, External memory interface, Interrupts, fixed and floating-point formats, Peripheral modules: GPIO, Timers, I2C, McBSP, HPI, EMIF (Brief description only).	9	25
3	FIR, IIR Digital Filter & FFT: Introduction to the Z-transform, FIR filters, FIR implementations using Fourier series, window functions. IIR filter structures, bilinear transformations. Development of FFT algorithm with Radix-2, Decimation-in-Frequency FFT algorithm with Radix-2, Decimation-in-Time FFT algorithm with Radix-2, bit reversal for unscrambling, Development of FFT algorithm with Radix-4, inverse FFT	10	25
4	DSP Applications: Voice scrambler using DMA and user switches, PLL, SB-ADPCM Encoder/Decoder: Implementation of G.722 Audio Coding, Adaptive Temporal Attenuator, Image Processing, Filter Design and Implementation Using a Modified Prony's Method, FSK Modem, μ -Law for Speech Companding, Voice Detection and Reverse Playback, Acoustic Direction Tracker, Multirate Filter, Neural Network for Signal Recognition, PID Controller, Four Channel Multiplexer for Fast Data Acquisition, Video Line Rate Analysis	10	25
5	Current trends: Current trends in digital signal processors/controllers, Architecture and their applications	4	15
Total		39	100

Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the time table) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same. Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or others of same repute.

List of Text Book:

1. "Digital Signal Processing and Application with C6713 and C6416 DSK", Rulph Chassaing, Johan Wiley and Sons Inc.
2. "DSP Applications using 'C' and the TMS320C6X DSK", Rulph Chassaing, Johan Wiley and Sons Inc.
3. Data sheet of TMS320C2000, TMS320C5000, TMS320C6000 and TMS320C6713

List of Reference Books:

1. "Digital Signal Processing Implementation using the TMS320C6000 DSP Platform", Naim Dahnoun, First Edition, Prentice-Hall
2. "Digital Signal Processing – A Student Guide", T. J. Terrel, Lik-Kwan Shark, first edition, Macmillan Press Ltd.,
3. "Digital Signal Processing: A System Design Approach", David J. Defatta, G. Lucas Joseph, S., Hodkiss William, First edition, John Wiley and Sons Inc.
4. "Digital Signal Processing - A Practical Guide for Engineers and Scientists", Elsevier Science

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand the various components of TMS320C6X families. At the end of the semester,	1 Remembering 2 Understanding
CLO2	To understand and able to develop a DSP based applications such as voice scrambler, PLL, encoder/decoder, audio coding, modems, voice detection.	2 Understanding
CLO3	To understand the application, advanced topics, various DSP system design based on Texas platforms.	2 Understanding
CLO4	To understand the FIR, IIR Digital Filter & FFT	2 Understanding 3 Applying
CLO5	To understand the Voice scrambler using DMA and user switches, PLL, SB-ADPCM Encoder/Decoder: Implementation of G.722 Audio Coding, Adaptive Temporal Attenuator	2 Understanding 4 Analyze

CLO6	To understand the Current trends in digital signal processors/controllers, Architecture and their applications	2 Understanding 6 Create
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Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1					L	M						H	H	M	L	
CLO2		H	M	M	L					L		H		M	L	
CLO3		M	H		L									H		L
CLO4		M	H		L			L					L		M	H
CLO5	H	M	H		L				L			H	L		M	H
CLO6	H	M	H		L							M	L		M	H

H: High, M: Medium, L: Low