



FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Engineering

Semester - I

Course Code: 102430107

Course Title: DSP Architecture

Type of Course: Program Elective - II

Course Objectives: Students of ME in Signal Processing and Communication will get knowledge of the implementation of various signal processing algorithms and their programming. Students will also study the architecture of advanced DSP processors and program it for various signal processing applications.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30/15	20/10	70/35	30/15	150/75

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Overview of Digital Signal Processing : Digital Signal Processing systems, Digital Signals and operations, The z-transforms, Linear time invariant systems	08
2	Introduction of Programmable DSPs: Processing architectures (Von Neumann and Harvard), DSP Core algorithms (FIR,IIR, Convolution, Correlation), Special architecture modules like MAC Unite, Barrel Shifters, Parallelism, Pipelining, On chip peripherals, Data representation and arithmetic	10
3	Fixed Point DSPs: Texas Instruments Digital Signal Processors family, Fixed point TI DSP Processors, TMS320C54X family: Internal architecture, arithmetic and logic unit, auxiliary registers, addressing modes, memory map, interrupt systems and peripheral devises	10
4	Floating Point DSPs: Concept of VLIW architecture, TMS320C67X family: Internal architecture, arithmetic and logic unit, auxiliary registers, addressing modes, memory map, interrupt systems and peripheral devises	10
5	Floating Point DSP Programming:Introduction to CCS , Instruction set of TMS320C6713, Addressing modes of TMS320C6713, Basic algorithms	04



programming in C and assembly	
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Suggested Specification table with Marks (Theory) (Revised Bloom’s Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
20%	40%	20%	10%	5%	5%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	B. Venkataramani, M. Bhaskar “Digital Signal Processors: Architecture, Programming and Applications”, Tata McGraw-Hill
2	Sen M. Kuo, Woon-Seng S. Gan, “Digital Signal Processors: Architectures, Implementations and Applications”, Pearson Education
3	TMS320C6000 CPU and Instruction Set, SPRU189F, Texas Instruments, Dallas, TX, 2000.
4	Emmanuel C. Ifeachor, Barrie W. Jervis, “Digital Signal Processing: A Practical Approach”, Pearson Education
5	Alan V. Oppenheim, Ronald W. Schafer, “ Discrete-Time Signal Processing”, Pearson Education

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn the basic concept of Digital Signal Processing	15
CO-2	Learn the concepts and characteristics of Programmable DSPs	25
CO-3	Explain the importance and applications of on chip peripherals of DSP processors	25
CO-4	Understand the architecture and basic operations of fixed point and floating point architectures	25
CO-5	Write, debug and simulate assembly and C code for DSP processor on CCS platform.	10

List of Practical / Tutorials:

1	Introduction of code composer studio.
2	Write and verify assembly language or C program using C67x processor for data transfer operation.
3	Write and verify assembly language or C program using C67x processor for arithmetic operation.
4	Write and verify assembly language or C program using C67x processor for logical operation
5	Write and verify assembly language or C program using C67x processor for various other operations.
6	Write an assembly language and C program using a C67x processor for various operations and verify it on DSP Kit.
7	Write an assembly language and C program using a C67x processor to generate a Sinusoidal signal.



8	Write an assembly language and C program using a C67x processor to find convolution of two sequences.
9	Write an assembly language and C program using a C67x processor to find correlation of two sequences.
10	Write an assembly and C program using a C67x processor to compute 8-point DFT.

Supplementary learning Material:

1	Code composer studio
2	www.ti.com
3	www.nptel.ac.in

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22