DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	***B. Tech.*** ***Electronics and Communication Engineering***		
Course Title	***Digital Signal Processing Laboratory***		
Course Code	***ECLR15***	**No. of Credits**	***2 (Two)***
Pre-requisite subject(s)	***ECPC15 Digital Signal Processing***		
Session	July 2023	**Section (if, applicable)**	B
Name of Faculty	Dr. Bibin Francis	**Department**	*ECE*
Email	*bibin@nitt.edu*	**Telephone No.**	
Name of Course Coordinator(s) (if, applicable)			
E-mail		**Telephone No.**	**---**
Course Type	**ELR (Essential Laboratory Requirement)**		

Syllabus (approved in BoS)

MATLAB tool based simulation experiments:

1. *Realization of correlation of two discrete signals*
2. *Realization of convolution*
3. *FIR filter design*
4. *IIR filter design*
5. *DFT implementation*
6. *SNR and power spectral density estimation of signals*

TMS320C5416 Digital Signal Processor kit based Experiments

1. *Study of various addressing modes and arithmetic sequence generation*
2. *Convolution using MAC, MACD and MACP instructions. Convolution using overlap add and overlap save method*
3. *Wave pattern generation*
4. *FIR filter implementation*
5. *DFT implementation using FFT radix-2 algorithm*
6. *Serial interface and data acquisition*

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. *Refer the presentation sildes given for each experiment.*
2. *B.Venkataramani and M.Bhaskar, "Digital Signal Processor, Architecture, Programming and Applications",(2/e), McGraw- Hill,2010*
3. *S.Srinivasan and Avtar Singh, "Digital Signal Processing, Implementations using DSP Microprocessors with Examples from TMS320C54X", Brooks/Cole, 2004.*
4. *S.M.Kuo and W.S.S.Gan," Digital Signal Processors: Architectures, Implementations, and Applications", Printice Hall, 2004*

COURSE OBJECTIVES

- To program and analyze the signal processing functions such as convolution, correlation etc. using Matlab tool.
- To learn and implement algorithms for FIR, IIR filters and DFT using FFT using Matlab tool.
- To learn the addressing modes and implement the DSP algorithms in digital signal processors.

COURSE OUTCOMES (CO)

Course Outcomes	**Aligned Programme Outcomes (PO)**
1. Write Matlab program for signal processing functions	PO1,PO2,PO3,PO4,PO5,PO6
2. Implement algorithms to realize digital filters and transforms	PO1,PO2,PO3,PO4,PO5,PO6,PO9,PO10,PO11
3. Write and execute application program in digital signal processors	PO3,PO4,PO5, PO6,PO9,PO10,PO11
4. Implement signal processing algorithms in digital signal processors	PO3,PO4,PO5,PO6, PO9,PO10,PO11
5. Learn real time interfacing and data acquisition of signals	PO3,PO4, PO5,PO6, PO9,PO10,PO11

COURSE PLAN – PART II

COURSE OVERVIEW

Digital Signal Processing Laboratory intends to provide the students with the basic understandings about MATLAB implementation of discrete systems and system functions like convolution, correlation, filters and exposure to computational algorithms like DFT, FFT etc., The students are exposed to architectures of DSP processors, it's assembly language programming in TMS320C5416 DSP Processor and implementation of the digital signal processing algorithms using DSP processors.

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	**Week**	**Topic**	**Mode of Delivery**
		Mat lab tool Experiments	
1	*I WEEK*	*Demo*	
2	*II WEEK*	*Realization of correlation of two discrete signals*	*Lab Exercise*
3	*III WEEK*	*Realization of convolution*	*Lab Exercise*
4	*IV WEEK*	*FIR filter design*	*Lab Exercise*
5	*V WEEK*	*IIR filter design*	*Lab Exercise*
6	*VI WEEK*	*DFT implementation*	*Lab Exercise*
7	*VII WEEK*	SNR and power spectral density estimation of signals	*Lab Exercise*
		TMS320C54X Processor Experiments	
8	*VIII WEEK*	*Demo*	
9	*IX WEEK*	*Study of various addressing modes and arithmetic sequence generation*	*Lab Exercise*
10	*X WEEK*	*Convolution using MAC, MACD and MACP instructions. Convolution using overlap add and overlap save method*	*Lab Exercise*
11	*XI WEEK*	*Wave pattern generation*	*Lab Exercise*
12	*XII WEEK*	*FIR filter implementation*	*Lab Exercise*

13	*XIII WEEK*	*DFT implementation using FFT radix-2 algorithm*	*Lab Exercise*
14	*XIVWEEK*	*Serial interface and data acquisition*	*Lab Exercise*
15	*XV WEEK*	*For repeat experiments*	*Lab Exercise*

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S. No.	***Mode of Assessment***	***Week/Date***	***Duration***	***% Weightage***
1.	*Record work*	*One experiment to be completed every week. The prepared record for each experiment to be submitted every week through online mode before the start of the next experiment.*	*Every week*	*10*
2	*Oral viva*	*To test students understanding*	*10 minutes*	*20*
3.	*Objective Written Exam*	*One week prior to final assessment Matlab, DSP processor*	*1 hour*	*40*
4.	*Final assessment*	*One week before the theory assessments*	*3 hours*	*30*

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1*. Feedback from students during class committee meetings*
2. Feedback directly also from students

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

COURSE ASSESSMENT:

1. *Attending all the assessments are mandatory for every student.*
2. *No compensation assessment for Assessment 3.*
3. *Finally, every student is expected to score minimum marks as per the regulations of the institute out of the total assessments. Otherwise student would be declared fail and 'F' grade will be awarded.*

MODE OF CORRESPONDENCE (email/ phone etc.)

1. *Doubts regarding the course can be clarified by fixing proper timing with the teacher during working hours only.*
2. *Queries, if any regarding the course shall only through email to the teacher.*

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

1. ***At least 75% attendance in each course is mandatory.***
2. ***A maximum of 10% shall be allowed under On Duty (OD) category.***
3. *Students with* ***less than 65% of attendance*** *shall be prevented from writing the final assessment and* ***shall be awarded 'V' grade.***

ACADEMIC DISHONESTY & PLAGIARISM

1. *Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.*
2. *Zero mark to be awarded for the offenders. For copying from another student, both*

students get the same penalty of zero mark.

3. *The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.*

   The above policy against academic dishonesty shall be applicable for all the programs.

ADDITIONAL INFORMATION

The faculty is available for consultation at times as per the intimation given by the faculty.

FOR APPROVAL

08-08-2023

Course Faculty	**CC-Chairperson**	**HOD**