

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

III-Year (July Session)

Section-B

COURSE OUTLINE TEMPLATE			
Course Title	DIGITAL SIGNAL PROCESSING		
Course Code	EEPE20	No. of Credits	3
Department	Electrical and Electronics Engineering	Faculty	Ms. R. AGASTHIYA
Pre-requisite Course	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS, DIGITAL ELECTRONICS		
Course Coordinator	Ms. R. AGASTHIYA		
E-mail	agasthiya@nitt.edu	Telephone No.	-
Course Type	Elective Course		
COURSE OVERVIEW			
<p>This course gives the knowledge of analyzing digital signals using different types of transforms like Z-Transform, Discrete Fourier Transform and the properties behind these transforms.</p> <p>The course also deals with realization of digital filters like Infinite Impulse Response Filter and Finite Impulse Response Filter.</p> <p>Finally this course also includes the architecture and features of signal processor and motion controller.</p>			

COURSE OBJECTIVES To explore the basic concepts of digital signal processing in a simple and easy-to-understand manner.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
<p>On completion of the course the students will be able to</p> <ol style="list-style-type: none"> 1. Understand the operations on digital signals. 2. Analyze the signal processing concepts. 3. Design the systems required for digital signal processing. 	<p>PO₁, PO₂, PO₃, PO₆, PO₈, PO₁₂, PO₁₃ PO₁, PO₂, PO₃, PO₆, PO₈, PO₁₂, PO₁₃ PO₁, PO₂, PO₃, PO₆, PO₈, PO₁₂, PO₁₃</p>

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week	Topic	Mode of Delivery
1.	II week of July (10 th – 14 th) 1 hr	Introduction to the course	Lecture Ppt
2.	II week of July (10 th – 14 th) 2 hrs	Z- Transform – basic formulae and problems	Lecture Chalk and talk
3.	III week of July (17 th – 21 st) 3 hrs	Linearity shift - invariance - Unit sample response characterization – Convolution summation, causality	Lecture Chalk and talk
4.	IV week of July (24 th – 28 th) 3 hrs	Linear difference equations with constant coefficients and their solution System function-concept	Lecture Chalk and talk

5.	I week of August (1 st – 4 th) 3 hrs	Discrete Fourier Transform and its properties – Circular convolution – Linear convolution of two finite length sequences through circular convolution, Sectioned convolutions	Lecture <i>Chalk and talk</i>
6.	II week of August (7 th – 11 th) 3 hrs	Relationship between Z Transform, Fourier Transform and the Discrete Fourier Transform	Lecture <i>Chalk and talk</i>
7.	III week of August (14 th – 18 th) 1 hr	Assessment 1	Objective type
8.	III week of August (14 th – 18 th) 2 hrs	Digital filter sampling, Introduction to radix-2 FFT – decimation-in-time and decimation-in-frequency radix-2 algorithm	Lecture <i>Chalk and talk</i>
9.	IV week of August (21 st – 24 th) 2 hrs	Problem Solving	Lecture <i>Chalk and talk</i>
10.	V week of August (28 th – 31 st) 2 hrs	Amplitude and phase response of FIR filters Linear phase filters	Lecture <i>Chalk and talk</i>
11.	I week of September (1 st – 8 th) 3 hrs	Windowing technique for the design of linear phase FIR filters – Rectangular Window, Hamming and Kaiser windows	Lecture <i>Chalk and talk</i>
12.	I week of September (1 st – 8 th) 1 hrs	Assessment 2	Problem Solving
13.	II week of September (11 th – 15 th) 3 hrs	Frequency sampling technique	Lecture <i>Chalk and talk</i>
14.	III week of September (18 th – 20 th) 1hr	Introduction to optimal filters	Lecture <i>Chalk and talk</i>

15.	IV week of September (25 th – 28 th) 1hr	Assessment 3	Assignment Test
16.	IV week of September (25 th – 28 th) 1hr	Properties of IIR digital filters	Lecture <i>Chalk and talk</i>
17.	I week of October (3 rd – 6 th) 2 hrs	Design of IIR filters from continuous time filters – Impulse invariance and Bilinear transformation technique	Lecture <i>Chalk and talk</i>
18.	I week of October (3 rd – 6 th) 1 hr II week of October (9 th – 13 th) 1 hr	Finite Word Length Effects – Elementary ideas of finite word length effects in digital filters	Lecture <i>Chalk and talk</i>
19.	II week of October (9 th – 13 th) 1 hr	Assessment 4	Objective type test
20.	II week of October (9 th – 13 th) 1 hr	Architecture and features of signal processor and motion controller Von Neumann Architecture	Lecture <i>Chalk and talk</i>
21.	III week of October (16 th – 20 th) 2 hrs IV week of October (23 th – 27 th) 1 hr	Harvard Architecture Addressing modes and instruction set	Lecture <i>Chalk and talk</i>
22.	IV week of October (23 th – 27 th) 1 hr	Assessment 5	Problem solving
23.	II week of November (6 th – 11 th) 1 hr	CPA	
24.	III Week of November (13 th - 17 th) 2 hrs	Assessment 6	End semester exam- Descriptive Type

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Objective Type	III week of August (14 th – 18 th)	1 hr	10%
2.	Problem solving	I week of September (1 st – 8 th)	1 hr	10%
3.	Assignment test	IV week of September (25 th – 28 th)	1 hr	20%
4.	Objective Type	II week of October (9 th – 13 th)	1 hr	10%
5.	Problem Solving	IV week of October (23 th – 27 th)	1hr	20%
6.	CPA	II week of November (6 th – 11 th)	1hr	20%
7.	End Semester exam	III Week of November (13 th - 17 th)	2 hrs	30%

ESSENTIAL READINGS : Text books, Reference books, Website addresses, Journals, etc

Text Books:

1. Oppenheim and Schaffer, 'Discrete Time Signal processing', Pearson Education Publications, 3rd Edition, 2010.
2. John G Proakis, Dimitris K Manolakis, 'Digital Signal Processing', Prentice Hall International, 4th Edition, 2007.
3. Ludemann L. C., 'Fundamentals of Digital Signal Processing', Harper and Row Publications, 1st Edition, 1992.

Reference Books:

1. Rabiner & Gold, 'Theory and Applications of Digital Signal Processing', PHI Learning Publications, 1st Edition, 2009.
2. Hamid A.Toliat and Steven G. Campbell, 'DSP Based Electro Mechanical Motion Control', CRC Press, 1st Edition, 2004.

COURSE EXIT SURVEY

1. Students' feedback through class committee meetings
2. Feedback questionnaire from students – twice during the semester
3. Feedback from students on Course Outcomes at the end of the semester


COURSE POLICY

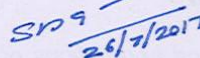
1. All the students are expected to attend all the contact hours.
2. Students who fall short of 75% attendance to the contact hours are not eligible to appear for the final written examination of 30% weightage.
3. Any Student who fails to maintain 75% attendance needs to appear for a CPA exam. Student who scores more than 50% will be eligible for attending the end semester examination.
4. Students not having 75% attendance and also fail in CPA exam will have to redo the course.
5. Attending all the assessments is MANDATORY for every student.
6. If any student is not able to attend any of the continuous assessments, due to genuine reason, student is permitted to attend the compensation assessment (CPA) with 20 % weightage. At any case, CPA will not be considered as an improvement test.
7. Relative grading with a passing minimum is as per our institute norms
In case of any student found guilty indulging in any mal practice, he/she will be awarded no marks in that particular assessment. If found using mobile phones or any other gadgets for any mal-practice during the final written examination, the answer sheet of the student will not be evaluated and will be awarded ZERO marks in the final written examination.


ADDITIONAL COURSE INFORMATION

1. The Course Coordinator is available for consultation during the time intimated to the students then and there.
2. All correspondence will be sent to the webmail id of the students alone. Hence all students are advised to check their webmail ids regularly.

FOR SENATE'S CONSIDERATION


[R. Agasthiya, TF/EEE]
Course Faculty


[Dr. Sishaj P Simon]
CC-Chairperson


26/07/2017
HoD/EEE