

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

COURSE PLAN – PART I			
Course Title	Digital Signal Processing		
Course Code	ECPC15	No. of Credits	4
Course Code of Pre-requisite subject(s)	ECPC10		
Session	Jan 2019	Section (if, applicable)	A
Name of Faculty	S. Deivalakshmi	Department	ECE
Email	deiva@nitt.edu	Telephone No.	0431-250 3321
Name of Course Coordinator(s) (if, applicable)	Dr. S. Deivalakshmi		
E-mail	deiva@nitt.edu	Telephone No.	0431-250 3321
Course Type	<input checked="" type="checkbox"/> Core course		
<b>Syllabus (approved in BoS)</b>			
Yes, Approved in the BoS-2017			
<b>COURSE OBJECTIVES</b>			
To expose the students to the rudiments of Digital signal processing .			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>	<b>Aligned Programme Outcomes (PO)</b>		
Students are able to At the end of the course student will be able			
CO1: Analyze discrete-time systems in both time & transform domain and also through pole-zero placement.	PO1, PO2		
CO2: Analyze discrete-time signals and systems using DFT and FFT.	PO1, PO2		
CO3: Design and implement digital finite impulse response (FIR) filters.	PO1, PO2		

CO4: Design and implement digital infinite impulse response(IIR) filters.	PO1, PO2
CO5: Understand and develop multirate digital signal processing systems.	PO1, PO2

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>The subject aims to introduce the mathematical approach to manipulate discrete time signals, which are useful to learn digital tele-communication.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Day	Topic	Mode of Delivery
1.	1	Course Introduction	Lecture / C & T
2.	2	Review of VLSI system theory	
3.	3	Cepstrum	
4.	4	Frequency response of discrete time systems- Frequency response Computation	
5.	5	Digital Low pass filter, High Pass Filter	
6.	6	Digital Resonator, Notch Filter	
7.	7	Comb Filter	
8.	8	All pass, Inverse System	
9.	9	Minimum, maximum, Mixed phase Systems	
10.	10	DFT	
11.	11	Relationship of DFT to other transforms,	
12.	12	FFT, DIT	
13.	13	DIF, FFT algorithm,	
14.	14	Linear filtering using DFT and FFT.	

15.	15	Linear filtering using FFT		
16.	16	Problem solving		
17.	<b>ASSESSMENT 1 - 20 MARKS</b>		<b>WRITTEN TEST</b>	
18.	18	Frequency response of FIR filter types,	<b>Lecture/ C &amp; T</b>	
19.	19, 20,21	Design of FIR filters		
20.	22,23,24	IIR filter design,		
21.	25	Mapping formulas,		
22.	26	Frequency transformations.		
23.	27,28, 29	Direct form realization of FIR and IIR systems,		
24.	30, 31	Lattice structure for FIR and IIR systems.	<b>Lecture / C &amp; T</b>	
25.	32,33	Finite-word length effects.		
26.	34	Limit cycle oscillations.		
27.	<b>ASSESSMENT II - 20 MARKS</b>			<b>WRITTEN TEST</b>
28.	<b>UNIT V</b>			
29.	35	Sampling rate conversion by an integer and rational factor.	<b>Lecture / C &amp; T</b>	
30.	36,37	Details of Poly phase FIR structures.		
31.	38, 39, 40	Poly phase FIR structures for sampling rate conversion.		
32.	<b>End Semester</b>		<b>WRITTEN TEST</b>	
<b>COURSE ASSESSMENT METHODS</b>				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Assessment– 1	<b>2nd week of February</b>	1 hour	20
2.	Assessment – 2	<b>2nd week of March</b>	1 hour	20
3.	Compensation Assessment	<b>1<sup>st</sup> week of</b>	1 hour	20



		<b>April</b>		
4.	Problem Solving Skill test	2 <sup>nd</sup> week of April		10
	Assignment	2 <sup>nd</sup> week of April		
5.	End Semester Exam	4 <sup>th</sup> week April	3 hour	50

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

**Textbooks:**

1. J.G.Proakis, D.G. Manolakis, "Digital Signal Processing", (4/e) Pearson, 2007.
2. A.V.Oppenheim&R.W.Schafer, " Discrete Time Signal processing", (2/e), Pearson Education, 2003.
3. S.K.Mitra, "Digital Signal Processing (3/e)", Tata McGraw Hill, 2006.

**Reference Books:**

1. P.S.R.Diniz, E.A.B.da Silva and S.L.Netto, " Digital Signal Processing", Cambridge,2002.
2. E.C.Ifeachor&B.W.Jervis, "Digital Signal Processing", (2/e), Pearson Education, 2002.
3. J.R.Jhonson, "Introduction to Digital Signal Processing", Prentice-Hall, 1989.

**COURSE EXIT SURVEY**

1. The students through class representative may give their feedback at any time which will be duly addressed.
2. Feedback from the students through MIS and class committee meetings.

**COURSE POLICY**

**CORRESPONDENCE**

1. All the students are advised to come to the class regularly. All the correspondence (schedule of classes/ schedule of assignment/ course material/ any other information regarding this course) will be intimated in the class only.

**COMPENSATION ASSESSMENT POLICY**

1. If any student who fails to attend assessment 1 or assesment 2 due to any **genuine reasons**, student is permitted to attend **compensation assessment** for the weightage of 20 % (Including assessment I & assessment 2 Portions)

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

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

### **ASSESSMENT**

1. Attending **all the assessments are mandatory** for every student.
2. Finally every student is expected to score minimum 35% or Class average/2, whichever is greater including all assessments to pass the course. Otherwise student would be declared fail and 'F' grade will be awarded. Otherwise student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT.
3. Please refer to B.Tech Regulations 2015 for the letter grades and corresponding grades.

### **ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- 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 programmes. **The students are expected to follow institute rules.**

### **FOR APPROVAL**

Course Faculty S. Deirda CC-Chairperson S. Balaji HOD [Signature]