

Branch Name:	Signal Processing and Communication
Program Code:	ET214
Course Name:	Detection and Estimation Theory Practical
Course Code:	2ET2140104P
Pre-requisite Subject	Signals and Systems, Probability and Random Processes, Linear Algebra

Course Objective:

1. To study the detection and estimation with the processing of information bearing signals for the purpose of making inferences about the information that they contain.
2. To provide an introduction to the theoretical principles underlying the development and analysis of techniques for such processing.
3. To study the Detection and estimation applications involving making inferences from observations that are distorted or corrupted in some manner.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCE		SEE		CCE		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1	-	-	2	2	-	-			10	25	10	25	50

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	To Perform Gaussian variables and processes	2	8	
2	To Perform problem formulation and Objective of signal detection and signal parameter estimation in discrete-time domain	2	8	
3	To Perform Matched filter detector and its performance	2	8	
4	To Perform Bayesian, minimax, and Neyman-Pearson decision rules	2	8	
5	To Perform receiver operating characteristics, composite hypothesis	4	18	
6	To Perform detector comparison techniques, asymptotic relative efficiency	4	18	
7	To Perform detection of sinusoid with unknown amplitude, phase, frequency and arrival time, linear model	2	8	
8	To Perform detection of Gaussian random signal with unknown parameters, weak signal detection	2	8	

9	To Perform Estimator-correlator, linear model, general Gaussian detection	2	8
10	To Perform Detection in the absence of complete statistical description of observations	4	8

References

1. "An Introduction to Signal Detection and Estimation", H.V. Poor, Springer, Second Edition, 1998
2. "Fundamentals of Statistical Signal Processing: Detection Theory", S.M. Kay, Prentice Hall, 1998
3. "Fundamentals of Statistical Signal Processing: Estimation Theory", S.M. Kay, Prentice Hall, 1993

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

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand statistical decision theory, detection of deterministic and random signals, nonparametric detection	1 Remembering 2 Understanding
CLO2	To understand and Learn various estimations methods.	2 Understanding
CLO3	To develop various applications namely, Direction-of-arrival and time-of-arrival estimation algorithms, Source localization/positioning systems,	2 Understanding
CLO4	Detection of weak signals and signals with structure.	3 Applying
CLO5	Estimation of Signal Parameters	4 Analyze
CLO6	Signal Estimation in Discrete-Time	6 Create

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