

COURSE CODE	COURSE TITLE	L	T	P	C
1154AE109	ELECTRONIC WARFARE	3	0	0	3

Course Category:

University Elective

a. Preamble:

The course aims at providing an understanding of the issues associated with the design and provision of tactical electronic warfare systems on the modern battlefield. The course has its emphasis on presenting the students with the concepts of Electronic support measures and Electronic Counter measures.

b. Prerequisite Courses:

- Discrete Time Signal Processing
- Waveguides and Antennas

c. Related Courses:

- Major Project

d. Course Educational Objectives :

- To discuss in general the taxonomy of electronic warfare and their importance.
- To understand the principles of Electronic warfare system.
- To know about the current challenges and future developments of Electronic Warfare.

e. Course Outcomes :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Tell the principles of electronic warfare and its taxonomy.	K2
CO2	Describe the radar warning receivers, and state the direction-finding principles	K2
CO3	Apply the ECM jamming equations and solve typical numerical problems	K3
CO4	Describe input and output signal processing in the design of warfare systems	K2
CO5	To identify various ECCM techniques and state developments of Electronic warfare.	K3

Correlation of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2	H							H				
CO3	H					M		H			M	
CO4	H					M		H			M	
CO5	H									M		

H- High; M-Medium; L-Low

f. Course Contents :

UNIT I - ELECTRONIC WARFARE (EW) PRINCIPLES L-9

Electronic Warfare Taxonomy - Electronic Warfare Definitions and areas – A Typical EW System

UNIT II – ELECTRONIC SUPPORT MEASURE (ESM) RECEIVERS L-9

Radar Warning Receivers (RWR) - Passive direction finding and emitter - location - Modern ECM systems.

UNIT III -RADAR AND ECM PERFORMANCE ANALYSIS L-9

Radar Detection Performance - ECM Jamming Equations - Repeater Jammer Equations - EW Receiver Sensitivity.

UNIT IV - EW SIGNAL PROCESSING L-9

Input signal processing - Signal environment - EM sensor subsystem - The receiver subsystem - The pre-processor- the data servo loop -Output signal processing - Advanced pulley power - Managed Jamming.

UNITV - ELECTRONIC COUNTER - COUNTER MEASURES (ECCM) L-9

ECCM techniques - Radar applications in weapon systems - Radar types and characteristics - Low Observability EW technology – EW Future trends

Total periods: 45

h. Learning Resources

i. Text Books:

1. D. Curtis Schleher, “Introduction to electronic warfare “Artech house radar library.

ii. References:

1. Mario De Archnaelis, “Electronic War from Battle of Osushima to the Falklands and Lebanon Conflicts”, Ritana Books, New Delhi, 1990. 3
2. Sen, A.K. Bhattacharya, A.B. “Radar Systems & Radar Aids to Navigation”, Khanna Publishers, 1988.