



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Master of Technology in Power & Energy Systems	Year of Regulation	2022-23
Department	Electrical Engineering	Semester	II
Course Code	Course Name	Pre-Requisite	Credit Structure
			Marks Distribution
			L T P C INT MID END Total
EE 502	Wide Area Monitoring System	---	3 0 0 3 50 50 100 200

SYLLABUS

No.	Content	Hours	
I	Introduction Basic architecture; basic principles for wide area monitoring and control in real-time; dynamic modelling of synchronous generator; transient stability monitoring and control; small signal monitoring and control	08	
II	Characterization of Phasor Fourier concepts and applications; sampling data and aliasing; phasor estimation of nominal frequency inputs; phasor estimation of off-nominal frequency inputs, single phase, multiphase, unbalanced systems, sequence components estimation	08	
III	Frequency Estimation Historical overview; balanced three phase inputs; unbalanced inputs; non-linear frequency estimators; advanced frequency measurement techniques	05	
IV	Phasor Measurement Units (PMU) and Phasor Data Concentrators Generic PMU, global positioning system, phasor measurement systems, communication system for PMU's, functional requirements for PMU's and PDC's, International Standards for PMU and Tests for Compliance	10	
V	WAMS Applications Synchrophasor applications in power system protection and emergency control; optimal placement of phasor measurement units; Real-time monitoring and control of voltage stability	09	
Total Hours		40	

Essential Readings

1. Antonello Monti, Carlo Muscas, Ferdinanda Ponci, "Phasor Measurement Units and Wide Area Monitoring Systems", Academic Press, 1st Edition, 2016
2. A. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2nd Edition, 2008.
3. M. Shadidehpour and Y. Wang, "Communication and Control in Electric Power System", Wiley, 1st Edition, 2001.

Supplementary Readings

1. P. Kundur, "Power System Stability and Control", Tata McGraw Hill, 2nd Edition, 2008.
2. P. M. Anderson and A. A. Fouad, "Power System Control and Stability", Wiley, 3rd Edition, 2006.
3. H. D. Chiang, "Direct Methods for Stability Analysis of Electric Power Systems: Theoretical Foundation, BCU Methodologies, and Applications", Wiley, 2nd Edition, 1999.