National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2019 – 20**
Department	**Electrical Engineering**	Semester	**VI**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EE 322	**Power System Overvoltages**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	Course Outcomes		
To understand the phenomena of Overvoltage in Power System		CO1	**Able to understand the occurrence of overvoltages**
To learn and analyse Lightning and switching overvoltages		CO2	**Able to analyse lightning & switching transients**
To learn about the over voltage protection system		CO3	**Able to design protection schemes against overvoltages**
		CO4	**Able to model and analyse the electrical equipments under transient condition**

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**
2	CO2	**3**	**3**	**2**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**
3	CO3	**3**	**3**	**2**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**2**
4	CO4	**3**	**2**	**3**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**2**
5	CO5															
6	CO6															

SYLLABUS

No.	Content	Hours	COs
I	**Introduction** Origin and nature of power system transient and surges**,** Switching and Lightning overvoltage, Traveling waves	**06**	**CO1**

II	**Lightning and Switching Overvoltage** **Lightning overvoltages:** Interaction between lightning and power system- ground wire voltage and voltage across insulator. **Switching overvoltage:** Short line or kilometric fault, energizing transients - closing and re-closing of lines, circuit breakerl; Current chopping, Capacitor switching, temporary overvoltages: line dropping, load rejection; voltage induced by fault.	**14**	**CO1** **CO2**
III	**Insulation coordination and Protection** Insulation coordination principles and applications, Statistical approach to insulation coordination, Protection of electrical equipments, Lightning arrestors, Surge capacitor and reactor, Grounding practice.	**08**	**CO1** **CO3**
IV	**Modeling of power apparatus under overvoltage condition** Overvoltage in transformer, overhead transmission lines & cables, generators & motors.	**08**	**CO2** **CO3** **CO4**
Total Hours		**36**	

Essential Readings

1. Allan Greenwood, “Electrical Transients in Power System”, Wiley, 2nd Edition, 2016.
2. Pritindra Chowdhuri, “Electromagnetic Transients in Power Systems”, Research Studies Press, 2nd Edition, 2004

Supplementary Readings

1. C. S. Indulkar, D. P. Kothari & K. Ramalingam, “Power System Transients – A Statistical Approach”, PHI Learning, 2nd Edition, 2012
2. Hermann W. Dommel, *EMTP Theory Book*, Microtran Power System Analysis Corporation, 2nd Edition, 1999.
3. Neville Watson & Jos Arrillaga, “Power System Electromagnetic Transients Simulation”, IET, 1st Edition, 2003