



# TULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING & TECHNOLOGY

Wardha Road, Nagpur - 441108

Accredited with NAAC A+ Grade

Approved by AICTE, New Delhi, Govt. of Maharashtra

(An Autonomous Institution Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur)



**Department of Electrical Engineering (NBA Accredited)**  
**Fourth Year (Semester-VIII) B. Tech. Electrical Engineering**  
**BTCHEE803: EHVAC and HVDC Transmission**  
**Assignment No.01**

1.	Explain the Necessity of EHV AC transmission.	CO1									
2.	Explain and derive cosine law of variation of surface voltage gradient of bundled conductors.	CO1									
3.	Prove that the percentage power loss in EHVAC transmission line is independent of its length and it depends on the ratio of conductor resistance to the positive sequence reactance per unit length.										
4.	Calculate the maximum voltage gradient on the center of outer phases of 3 conductors in case of EHVAC Transmission system of 735 kV line. The line parameter are $N = 4$ , $r=0.0176$ m, $B = 0.4572$ m for Bundled conductor of each phase. The line height and phase spacing in Horizontal Configuration are $H = 15$ m & $S = 15$ m use mangoldt formulae	CO1									
5.	A power of 2000 MW is to be transmitted from Chandrapur thermal power station to western part of Maharashtra over a distance of 800 km. Use 400 kV and 750 kV transmission system for it. Calculate number of circuits with 40% series capacitor compensation and also calculate the total power loss per km. Assume $\delta=30^\circ$ and values of 'x' and 'r' are as given below:	CO1									
	<table border="1"> <tr> <td>System (kv)</td> <td>400</td> <td>750</td> </tr> <tr> <td>x <math>\Omega</math>/km:</td> <td>0.327</td> <td>0.272</td> </tr> <tr> <td>r <math>\Omega</math>/km</td> <td>0.031</td> <td>0.0136</td> </tr> </table>	System (kv)	400	750	x $\Omega$ /km:	0.327	0.272	r $\Omega$ /km	0.031	0.0136	
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6.	A power of 2150 MW is to be transmitted over a distance of 920km on a voltage level of 400kv and 750 kv. line reactance and resistance are as follow.	CO1									
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Date of assignment display:19/12/2023

Date of assignment submission: 20/01/2024

Course Coordinator

HoD,EE