

A Seminar Report on

“Meta Material and its Application in Optical Communication”

Submitted to

Electronics and Communication Engineering Department

In partial fulfilment

of the requirements for the Degree of

Master of Technology

Submitted By

SHRISH BAJPAI

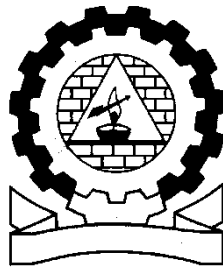
M.Tech (DCE), III Semester

Roll No: 6043380017

Under the guidance of

Dr. Yogendra Kumar Prajapati

Assistant Professor



Bundelkhand Institute of Engineering and Technology, Jhansi

Affiliated to G.B.Technical University, Lucknow)

ACKNOWLEDGEMENT

First of all, I would like to express my deep sense of respect and gratitude towards my advisor and guide **Dr. Yogendra Kumar Prajapati**, who has been the guiding force behind this work. I am greatly indebted to him for his constant encouragement, invaluable advice and for propelling me further in every aspect of my academic life. His presence and optimism have provided an invaluable influence on my career and outlook for the future. I consider it my good fortune to have got an opportunity to work with such a wonderful person.

I sincerely thank **Dr. Shahnaz Ayub**, Head of Department, ECE Department, BIET, Jhansi who provide me to all facilities and coordination. I would also thank the faculty members of ECE Department for providing me their valuable time for this seminar.

Furthermore, I would like to thank my course mates at the Bundelkhand Institute of Engineering and Technology, Jhansi, my friends & my family for their non-scientific support over the whole time.

SHRISH BAJPAI

M.Tech(DCE), III Semester

Roll No: 6043380017

ABSTRACT

Metamaterials are artificial materials engineered to provide properties which “may not be readily available in nature”. These materials are engineered structured materials which have both negative dielectric permittivity and negative magnetic permeability and usually gain their properties from structure rather than composition, using the inclusion of small inhomogeneities to enact effective macroscopic behaviour. The periodic structures are made up of single units called cells. These single units are much smaller than the wavelength of the radiated source. Metamaterials can have many striking applications in different fields such as optical communication, antenna, super lens, cloaking device etc.

Seminar Guide

Dr. Y.K. Prajapati
Assistant Professor, ECE Department
Bundelkhand Institute of Engineering
and Technology, Jhansi

Submitted By

Shrish Bajpai
Roll No.6043380017
M.TECH (3rd Semester, DCE)

CONTENT	PAGE NO.
<i>Acknowledgement</i>	
<i>Preface</i>	
1: Introduction to Meta material	1-6
1.1: Background and Motivation	1
1.2: Structured Electromagnetic Materials	1
1.3: Metamaterials: A Brief	3
1.4: Why metamaterials are used	5
2 : Fundamentals of Optical Metamaterial	7-13
2.1 Optical Metamaterials: Terminologies and Basic Properties	7
2.2 Structure of Optical Metamaterial	9
3 : Classification & Type of Optical Metamaterials	14-18
3.1: Type of Optical Metamaterials	15
4 : Application of Optical Metamaterial	19-21
5 : Conclusion	22
6 : References	23