

CONTENTS		
<i>List of Figures</i>		XIII
<i>List of Tables</i>		XXI
<i>List of Abbreviations</i>		XXII
<i>List of Symbols</i>		XXIV
 Chapter 1: Introduction and Literature Review 		
1.1	Introduction	1
1.2	Mathematical Representation of Graphene	4
1.3	Properties of Graphene	7
1.4	Metasurface, Graphene-based Metasurface and Subsequent Developments	17
1.5	Motivation	26
1.6	Organization of Dissertation	27
 Chapter 2: Tunable Graphene-Based Metasurfaces for Broadband Wave Absorption in Lower Mid-Infrared (MIR) Range & THz Gap 		
2.1	Introduction	30
2.2	Design and Simulation of Structure	34
2.3	Simulated Results and Discussions	37
2.4	Design and Simulation of Structure	47
2.5	Design Evolution of the Structure	52
2.6	Simulated Results and Discussions	54

2.7	Conclusions	62
Chapter 3: Graphene-Based Metasurface for Tunable Absorption and Transmission Characteristics in the Near Mid-Infrared Region		
3.1	Introduction	64
3.2	Design and Electromagnetic Execution of the Structure	66
3.3	Validation of the Simulated Results	71
3.4	Simulated Outputs and Explanations	75
3.5	Conclusions	90
Chapter 4: Terahertz Wave Conversion from Linear to Circular Polarization by Graphene Metasurfaces Featuring Tunable Performances		
4.1	Introduction	91
4.2	Design and Simulated Outcomes	92
4.3	Validation of Simulated Outcomes Using Circuit	100
4.4	Ultrawideband Tunability Achieved by the RLCPC	105
4.5	Theory of Transmittive Polarization of EM Wave	110
4.6	Design of the Device	112
4.7	Simulated Results	116
4.8	Discussions	120
4.9	Conclusions	129

Chapter 5: Graphene-based dual functional metadvice in the THz Gap		
5.1	Introduction	131
5.2	Configuration and Working Principle of the Device	133
5.3	Simulated Results and Discussions	135
5.4	Circuit Realization	144
5.5	Discussions	149
5.6	Conclusions	151
Chapter 6: Conclusions and Future Scope		
6.1	Conclusions	153
6.2	Suggestions for future scope	158
Publications		159
References		126

LIST OF FIGURES		
Fig. 1.1:	Schematic representation of formation of covalent bonds in graphene surface.	1
Fig. 1.2:	Schematic representation of the (a). different physical forms of carbon and (b). formation of the allotropes.	2
Fig. 1.3:	Current applications of graphene and graphene derivatives.	3