

TABLE OF CONTENT

COVER PAGE	i
DUAL DEGREE PROGRAM STATEMENT	ii
RECOMMENDATION FORM	iii
QUALIFICATION FORM	iv
LETTER OF APPROVAL	v
DECLARATION	vi
DEDICATION	vii
ABSTRACT	viii
ACKNOWLEDGEMENT	ix
TABLE OF CONTENT	x
LIST OF TABLE	xii
LIST OF FIGURE	xiii
LIST OF APPENDICES	xiv
LIST OF NOTATIONS AND ABBREVIATIONS	xv
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Problem Formulation	3
1.3 Objectives	3
1.4 Research Scope and Limitation	3
1.5 Benefits of Research	3
1.6 Organization	4
CHAPTER II LITERATURE REVIEW	5
2.1 Capacitated Vehicle Routing Problem	5
2.2 Open Vehicle Routing Problem	6
2.3 Particle Swarm Optimization	7
2.4 Literature Review Summary	8

CHAPTER III THEORITICAL BACKRGROUND	10
3.1 Vehicle Routing Problem	10
3.2 Minimum Cost Vertex-Disjoint Path Cover Problem (MCVDPCP)	11
3.3 Particle Swarm Optimization (PSO)	14
3.4 Parameter Used in PSO	18
3.5 Initialization	18
3.6 Solution Representation and Decoding Method	19
3.7 Neighborhood Improvement	20
CHAPTER IV RESEARCH METHODS	22
4.1 Research Design	22
4.2 Research Object	22
4.3 Research Tools	22
4.4 Research Framework	23
CHAPTER V COMPUTATIONAL STUDY	25
5.1 Benchmark Instances	25
5.2 Parameter setting	26
5.3 Parameter Checking	28
5.4 Algorithm Verification	30
5.5 Computational Study	32
5.6 Sensitivity Analysis	34
5.7 Real Application of MCVDPCP	37
CHAPTER VI CONCLUSION AND FUTURE RESEARCH	40
6.1 Conclusion	40
6.2 Recommendation Future Research	40
REFERENCES	41
APPENDICES	45