

TABLE OF CONTENTS

TITLE PAGE	i
VALIDITY SHEET	ii
STATEMENT SHEET	iii
TRIBUTE SHEET	iv
PREFACE	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF APPENDIXES	xi
ABSTRACT	xii
CHAPTER 1 INTRODUCTION	1
1.1. Background	1
1.2. Problem Definition	2
1.3. Research Scope and Limitation	2
1.4. Research Objective	3
1.5. Research Benefit	3
CHAPTER 2 LITERATURE REVIEW	4
2.1. Research Gap	4
CHAPTER 3 THEORITICAL BASE	7
3.1. Advanced Planning & Scheduling (APS)	7
3.1.1. History	7
3.1.2. Definition	8
3.1.3. Concept	9
3.1.4. Component	11
3.2. Industry 4.0 Environment	13
3.2.1. History	13
3.2.2. Concept	13
3.2.3. Industry 4.0-APS	14

CHAPTER 4 RESEARCH METHOD	16
4.1. Subject and Object	16
4.2. Assumption	16
4.3. General Study Framework	16
4.3.1. Initial Scheduling Generation Stage	17
4.3.2. Simulation-Case Generation Stage	18
4.3.3. Resource Modelling Examination Stage	19
4.4. Simulation Model Verification and Validation	23
CHAPTER 5 RESULT AND DISCUSSION	24
5.1. Initial Scheduling Generation	24
5.2. Simulation-case Generation	25
5.3. Examination Results: Discrete Batch	26
5.3.1. Working capacity	26
5.3.2. Processing time	26
5.3.3. Setup time	28
5.3.4. Transfer time	29
5.4. Examination Results: Continuous	30
5.4.1. Working capacity	30
5.4.2. Processing time	31
5.4.3. Setup time	32
5.4.4. Transfer time	33
5.5. Examination Results: Unpauseable with Full Break Time (UFBT)	34
5.5.1. Cycle time	34
5.5.2. Setup time	36
5.5.3. Transfer time	36
5.6. Examination Results: Unpauseable with Partial Break Time (UPBT)	37
5.6.1. Cycle time	37
5.6.2. Setup time	38
5.6.3. Transfer time	39
5.7. The Guidelines	40
5.8. The Guidelines Validity towards Uncertainty	41

CHAPTER 6 CONCLUSION	42
6.1. Conclusion	42
6.2. Future Research	42
REFERENCES	43
APPENDIXES	45