

COURSE CONTENT

| | | | |
|---------------------------|--|-----------------|---|
| Academic Year | 2018/19 | Semester | 2 |
| Course Coordinator | TEO CHEE CHONG | | |
| Course Code | MT4102 | | |
| Course Title | Distribution & Warehousing | | |
| Pre-requisites | Nil. | | |
| No of AUs | 3 AU | | |
| Contact Hours | Lecture: 26 hr ; Tutorial: 13 hr ; Lab: 0 hr | | |
| Proposal Date | January 2019 | | |

Course Aims

The fundamental objective of the course is to provide you with managerial fundamentals of physical distribution and warehousing operation. You will learn concepts and approaches that can contribute towards successful physical distribution and warehousing operations. This course will therefore focus on three areas of student learning:

- a. Operational aspects of distribution: management of inventory and freight transport
- b. Tactical/Strategic aspects of distribution: Distribution Network Design and Facility Location
- c. Warehousing operations: Planning and designing of basic warehousing processes and layouts

Intended Learning Outcomes (ILO)

After successfully completing the course, you will be able to:

1. Analyse the core logistics drivers (Facility, Inventory and Transport) and their cost trade-offs with relation to customer service in physical distribution.
2. Identify and explain how non-logistical factors can influence the success of physical distribution.
3. Propose suitable distribution networks for different products and/or businesses environments.
4. Discuss the purposes, benefits and limitations pertaining to various technologies and methodologies of different warehousing processes.
5. Propose suitable warehousing solutions for different operational scenarios with the aim of enhancing warehousing productivity.

Course Content

List of key topics taught

| | Topic | Lecture (hours) |
|----|--|-----------------|
| 1. | Introduction to the distribution and warehousing environment | 2 |

| | | |
|-----|---|---|
| 2. | Distribution management (1): Inventory management | 4 |
| 3. | Distribution management (2): Transport management | 2 |
| 4. | Distribution management (3): Facility location | 2 |
| 5. | Distribution network design | 2 |
| 6. | Classification of warehouses | 1 |
| 7. | Sizing of warehousing facilities | 1 |
| 8. | Inbound warehousing operations (Receiving, putaway and internal transportation) | 2 |
| 9. | Storage and Cross-docking. Order-picking. Shipping. | 4 |
| 10. | Warehouse efficiency and productivity Warehouse Management Systems (WMS). | 3 |

Assessment (includes both continuous and summative assessment)

| Component | Course LO Tested | Related Programme LO or Graduate Attributes | Weighting | Team/ Individual | Assessment rubrics |
|---|------------------|---|-----------|------------------|--------------------|
| 1. Final Examination | 1-6 | SLO* A, C, F, G, H | 55% | Individual | |
| 2. Continuous assessment (individual project with report) | 1-3 | SLO* A, C, D, F, G, H, I | 15% | Individual | Appendix |
| 3. Quiz 1 | 1-3 | SLO* A, C, F, G, H | 15% | Individual | |
| 4. Quiz 2 | 4-5 | SLO* A, C, F, G, H | 15% | Individual | |
| Total | | | 100% | | |

Programme Learning Outcomes

✓ **Competency**

- A. Develop an overall awareness of maritime activities, port and shipping industry and their association with economy and trade. Describe and apply concepts and theories in sub-fields as contributing to the maritime industry and integrate various related themes, skills and knowledge
- B. Understand and manage the maritime environment
- C. Apply related information pertaining to procedures, operations and management of maritime entities and operational issues in the maritime industry
- D. Capture and analyse market data using analytical tools, conduct related research in the maritime arena, as well as design, develop and execute maritime projects
- E. Appreciate the maritime environment for vocations and career options

✓ **Creativity**

- F. Approach and solve basic maritime problems, through both strategic and research methods, and put theoretical knowledge into practical applications in related industries
- G. Develop maritime related risk management strategies.

✓ **Communications**

- H. Communicate shipping and maritime management in policy, strategy, and prevailing issues and requirements in an organization and to achieve good teamwork.
- I. Write professional reports and conduct public speaking confidently

✓ **Character**

- J. Recognise the importance of a strong and just leadership, comply to ethical standards, and uphold highest standards of integrity as a professional

✓ **Civic Mindedness**

- K. Integrate all related skills and knowledge into the industry and exercise due diligence as a highly responsible professional, contributing towards nation and the society.

Formative feedback

Instructors take questions during and at end of lectures, and provide on-the-spot clarifications. You (students) can also confer with instructors at tutorials/discussions, at appointed consultations or via email.

You (students) are assessed on an individual project and two quizzes. The individual project requires submission of a written report. Feedback for both the project and quizzes will be provided upon the completion of grading. You will also be informed of your grades.

Learning and Teaching approach

| Approach | How does this approach support students in achieving the learning outcomes? |
|-----------------|---|
| Lectures | This provides you with the needed background for outcomes (1) to (5) and to allow you to apply principles and methodologies related to Distribution and Warehousing management, as well as the multi-disciplinary relationship with other factors (e.g., cross-functional factors and disruptive technologies). |
| Tutorials | Comprises mostly qualitative questions, some of which are open-ended case questions. Some quantitative questions are also included to provide practices for practical data-based analysis. The tutorials offer you with opportunities to analyse practical problems that address outcomes (1) to (5). |

Reading and References

List of references used in the course:

Readings are revised year to year to keep up with the latest development in the subject. Other more classic readings are mostly from the following books:

1. Chopra, S. & Meindl, P. (2015). Supply Chain Management – Strategy, Planning & Operations, Pearson Prentice Hall.
2. Frazelle, E.H. (2001). World-class warehousing and material handling, McGraw Hill.
3. Mulcahy, D.E. (1994). Warehouse distribution and operations handbook, McGraw Hill
4. Napolitano, M. (1998). Using modeling to solve warehousing problem: a collection of decision-making tools for warehouse planning, Warehousing Education and Research Council.

Course Policies and Student Responsibilities

(1) General

You are expected to take responsibility to follow up with course notes, assignments and course related announcements. You are also expected to participate in class discussions and submit the project report before the stipulated deadline.

(2) Absenteeism

Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

| Instructor | Office Location | Phone | Email |
|-------------------|------------------------|--------------|-------------------|
| Dr Teo Chee Chong | N1-01a-09 | 6790 4887 | TEOCC@ntu.edu.sg |
| Dr Lum Kit Meng | N1-01b-52 | 6790 5318 | CKMLUM@ntu.edu.sg |

Planned Weekly Schedule

| Week | Topic | Course LO | Readings/ Activities |
|-------------|---|------------------|-----------------------------|
| 1 | Introduction to course. Introduction to physical distribution and warehousing environment | 1 | Lectures |
| 2 | Distribution management (1): Inventory management – inventory policies (periodic and continuous) | 1 | Tutorial and lectures |
| 3 | Distribution management (1): Inventory management – centralization/decentralization of inventories; aggregation of stocks; postponement strategy. | 1, 2 | Tutorial and lectures |
| 4. | Introduction to distribution network design | 1, 2, 3 | Tutorial and lectures |
| 5 | Distribution management (2): Transport management – transport network configurations | 1, 2, 3 | Tutorial and lectures |
| 6 | Distribution management (3): Facility location | 1, 2 | Tutorial and lectures |
| 7 | Classification of warehouses; Sizing of warehousing facilities | 5 | Tutorial and lectures |
| 8 | Quiz 1 | | |
| 9 | Inbound warehousing operations | 4 | Tutorial and lectures |
| 10 | Storage and Cross-docking. | 4 | Tutorial and lectures |
| 11 | Order-picking. Shipping. | 4, | Tutorial and lectures |
| 12 | Warehouse Analysis. Principles of World-Class Warehousing. | 4, 5 | Tutorial and lectures |
| 13 | Warehouse Management Systems (WMS). Quiz 2. | 4, 5 | Tutorial and lectures |

Appendix: Individual Project with Written Report (15%)

The topics for the Individual Project covers ILO 1-3. You (student) will write an individual report on your findings. This assessment is covered by the following marking scheme. More details of the report length and specific requirements will be briefed by the course instructor.

| Criteria | Good (8-10) | Ave (6-7) | Fair (4-5) | Poor (1-3) | Remarks |
|--|---|--------------|---------------|---------------|---|
| Report generated by Turnitin | Within acceptable degree of originality? (Yes/No) | | | | Fresh report, in case of too many commonalities. |
| Background/ Objective/ Purpose | | | | | Accurate contextualisation of background and description. Well defined issues; clear objectives. |
| Methodology/ Information / Data Collection | | | | | Ability and independence in acquiring <u>relevant and useful</u> information/data for the study. |
| Findings and Discussion | | | | | Well-presented results with discussion, showing ability to understand problem, interpret information obtained, and be cognisant of limitations. Innovative (and well justified) solutions will be favourably evaluated. |
| Conclusions and Recommendations | | | | | Summarise report clearly and show ability to make appropriate and relevant conclusions, with clear and workable recommendations. |
| References and Report Format | | | | | Report is clear and concise; good grammar and spelling with appropriate tables/ graphs/ figures. Report is presented well with logical sequence. |

CURRENT APPROVED COURSE CONTENT

COURSE CONTENT

Date : September 2015
Academic Year : 2015-2016
Study Year (if applicable) : 4
Course Code & Title : MT4102 Distribution and Warehousing
Academic Unit : 3 AU
Pre-requisite : Nil
Course Description :

MT4102 Distribution and Warehousing

[Lecture: 26 hr ; Tutorial: 13 hr ; Lab: 0 hr ; Pre-requisite: Nil ; Academic Unit: 3.0]

Learning Objective :

To equip students with the fundamentals of distribution / warehousing planning and management.

Course Content :

The distribution environment. Distribution requirements planning. Warehouse planning. Warehousing and distribution: receiving, put-away, storage, order-picking and shipping. SKU handling and internal transportation. Warehouse productivity.

Course Outline :

| S/N | Topic | Lecture Hrs | Tutorial Hrs |
|--------|-------------------------------------|-------------|--------------|
| 1 | The distribution environment | 2 | 1 |
| 2 | Distribution requirements planning | 4 | 2 |
| 3 | Warehouse planning | 4 | 2 |
| 4 | Receiving | 2 | 1 |
| 5 | Put-away | 2 | 1 |
| 6 | Storage and Internal transportation | 4 | 2 |
| 7 | Order picking | 2 | 1 |
| 8 | Shipping | 2 | 1 |
| 9 | Warehouse productivity | 4 | 2 |
| Total: | | 26 | 13 |

Learning Outcome :

Upon completion of the course, students should be able to:

- (a) Have a good understanding of the essential concepts in distribution and warehousing
- (b) Able to plan and design basic processes and layout within a warehouse

Student Assessment :

Part A - Continual Assessment (40%) consists of,

Two quizzes (25% and 15% respectively)

- Both quizzes will be conducted during the Teaching Week to evaluate learning outcomes. Questions are designed to test students' understanding of basic concepts and principles as well as their ability in applying them in real application scenarios.

Part B - Examination (60%)

- Examination covers topics taught in all 13 Teaching Weeks. Questions are designed to test students' ability in understanding and applying basic concepts and principles in distribution and warehousing.
- It will be a 2.5 hours closed book written examination.

Textbooks :

1. Frazelle, E.H. (2001). World-class warehousing and material handling, McGraw Hill

References :

1. Mulcahy, D.E. (1994). Warehouse distribution and operations handbook, McGraw Hill
2. Napolitano, M. (1998). Using modeling to solve warehousing problem: a collection of decision-making tools for warehouse planning, Warehousing Education and Research Council.