Semester Manual

School: School of Technology and Logistics

Department: Logistics and Supply Chain

Location: Venlo

Semester: 3, second year

Title: Production Planning and Improvement

Length: 20 weeks

Offered: Winter Semester

Academic Calendar: End of Aug- End of Jan

Content

1. Introduction

Third Semester – Production Planning and Improvement

The third semester comprises a project and some four CAS-es, which are explained in this semester manual.

- Project→ 10 ECTS
- CAS 1 → Production foundation and Strategy → 5 ECTS
- CAS 2 → Production Organisation: functional → 5 ECTS
- CAS 3 → Production Organisation: Product Oriented→ 5 ECTS
- CAS 4 → Tools→ 5 ECTS

Every CAS is assessed with 5 credits and assessed by an examination. The form of examination will be described in each section. At the end of this document learning objectives are described per single CAS.

This is followed by a specification of the topics and learning objectives per CAS. For the link between the learning objectives and the competences, students are referred to the spreadsheet (Portal).

2. Project Description

Project 3 focuses on the theme of Production. The project consists of 2 parts: the first part is a practical part and the second is a business case.

Project 1	Topics	Remarks
Warehousing	The first introduction to the standard approach of projects within the course.	
	Orientation phase	Describing the company and its environment, resulting in a project plan.
	Gathering data phase	Presenting the data gathered from the current situation; describing the aspects relevant to the problem.
	Analysis phase	Identifying the causes of the problem
	Development phase	Drawing up some two possible solutions including advantages & disadvantages and consequences, on the basis of the theory presented.
	Implementation plan	This shows and explains the set-up of the plan (what aspects play a part here, e.g. change management).
	General project skills	Presenting, reporting, cooperating, studying, project-based approach and conducting interviews.

Part 1
Students themselves find a production company in which to carry out the project. They will spend 1 project day at the company and 1 project day at college.

Students are to define a problem, to be approved by the lecturers, together with the company. After approval by the lecturers, the orientation phase and the data gathering phase must be fully developed according the internship requirements. At the end of the report, students are to indicate how they would have continued the research if the analysis phase should have been developed and write a critical reflection.

The report is to be defended in a 20-minute presentation taking place when all criteria have been fulfilled. (see evaluation).

Part 2
Company Delckard produces desktop computers for three big B2B customers. Globalisation and strong competition and increasing costs make extreme efficiency and customer orientation in assortment and delivery lead time essential for survival.

Delckard computers are in fact variants that are assembled from a fairly limited set of standardised components and parts, which are available in the international market place. Its speciality is in the printed circuit board (PCB) design and in its customized casings.

In 2018, the board of directors have changed the business strategy:

- Shorten the lead time to 1 week for B2B computers
- Introduce a B2C business channel
- B2C computers will be made to full customer specification (not only standard parts are used)

Assignment

1. Draw up a project plan for the situation current situation.
2. Draw up a list of questions to gather facts about the situation above and analyse it.
3. Write a recommendation report for the Delckard management, consisting of a fact gathering phase, an analysis phase, an improvement phase and an implementation phase.

Examination
The project consists of 2 reports and 1 presentation: the company report, the company presentation and the business case report.

Both reports are assessed on the basis of the rubrics. Each report may be resat 1 time.

The group mark consists of 2 parts:

- Part 1 Report: 50% of the final mark
- Part 2 Report: 50% of the final mark

Individual project mark

Each student will be given an individual mark. This mark is obtained by means of a peer assessment that students and coaches engage in mutually. Students scoring better or worse than average are invited for an individual oral exam, in which the student may get a better / worse mark than the obtained group result. The peer assessments take place in week 19 and/or week 20.

The overall grade for passing this 10 ECTS project must be ≥5.5. The report and the presentation can be resit one time.

3. Description of the semester courses

- Project→ 10 ECTS
- CAS 1 → Production foundation and Strategy → 5 ECTS
- CAS 2 → Production Organisation: functional → 5 ECTS
- CAS 3 → Production Organisation: Product Oriented→ 5 ECTS
- CAS 4 → Tools→ 5 ECTS

3.1 CAS 1 Production foundation and Strategy

This CAS deals with the topic of production logistics where the Integral Logistics concept forms the basis. What is a production system and which strategic decision have to be taken when it comes to production planning. The focus is on production organization forms, hierarchies of planning and production control methods. The students gains insight in the challenges of production planning also with regard to different types of machines and processing. Last but not least it will be dealt with production costs.

CAS 1	Topics	Remarks
Production general and strategic		
	3.1.1 Production Organization Forms	Sorts of production organization forms
	3.1.2 Hierarchies of planning	Framework of production planning incl. information systems
	3.1.3 Production control methods	Different production control methods
	3.1.4 Production technologies	Which production processing are there and what sorts of machines
	3.1.5 Production costs	Which costs occur in a production company
	3.1.6 Trends and developments	Attention for new trends and developments

Examination
CAS 1 will be assessed by an individual, written exam.

The overall grade for passing this 5 ECTS module must be ≥5.5. There will be one resit for the exam.

3.2 Description CAS 2

This CAS is about the details of functional production organizations. The students gains knowledge about the questions arising when it comes to functional production planning. At the end of this CAS the student knows about the tactical and operational decisions to take so that a production department runs optimally.

CAS 2	Onderwerpen	Opmerkingen
Production, tactical, operational and functional organization		
	3.2.1 Management, organisation, control and planning	How do production organizations look? Which organizational structures can be applied in a functional organization? How do you control a functional organization?
	3.2.2 Economic aspects	Job Costing

Examination

CAS 1 will be assessed by an individual, written exam.

The overall grade for passing this 5 ECTS module must be ≥5.5. There will be one resit for the exam.

3.3 Description CAS 3

This CAS is about the details of product oriented production organizations. The students gains knowledge about the questions arising when it comes to product oriented production planning. At the end of this CAS the student knows how to set up an assembly line and knows how to implement a product oriented organization structure.

CAS 3	Topics	Remarks
Production, tactical, operational and product oriented organization		
	3.3.1 Management, organization, control and planning	How do production organizations look? Which organizational structures can be applied in a product oriented organization? How do you control a product oriented organization?
	3.3.2 Economische aspecten	Process costing

Examination

CAS 3 will be assessed by an individual written exam. The overall grade for passing this 5 ECTS module must be ≥5.5. There will be one resit for the exams.

3.4 Description CAS 4

In this CAS the content of project work will be deepened. Beside that methods from Operations Research will be taught. The central topics are Queuing theory, Quality Control, Network Planning and Linear Programming.

CAS 4	Topics	Remarks
Tools		
	3.4.1 Project work	Implementation Plan
	3.4.2 Stochastic models	Queuing times in different models
	3.4.3 Quality control	Hypotheses test and six sigma
	3.4.4 Network Planning	Network Planning (PERT)
	3.4.5 Linear Programming	Indication of optimal production mix through LP

Examination

CAS 3 will be assessed by an individual written exam. The overall grade for passing this 5 ECTS module must be ≥ 5.5. There will be one resit for the exams.

4. Topics and learning objectives per CAS

CAS 3.1	Content and learning objectives	Sub-topics
Production General and Strategic		
	3.1.1 Production Organization Methods ... on the basis of a description, student can make a choice of a suitable production organization method within a production environment.	• Production organization methods • Functional vs. Product oriented • Aspects affecting the choice of production organization forms • Relation with logistics concept
	3.1.2 Planning hierarchy … student applies the framework for production planning and understands what information flows are needed to be able to make a planning at each hierarchical level. … determines the best production strategy (Chase, level or mix) on the basis of relevant costs.	• Framework for production planning • Information systems and information flows with regard to input and outputs • Chase, Level, Mix production plan
	3.1.3 Production Control Method ... within a company situation, student can make a choice for the most suitable production control method and can link it to the production organization methods.	• Goods flow • Convergent vs. Divergent • Basic structure and CODP • Plan, order and inventory driven models • Relation with production organization forms
	3.1.4 Production Technologies …. on the basis of the aspects of product characteristic, production processing method and logistics issues, student can substantiate a choice of a machine type / production technique.	• Product characteristics (technically) • Production technologies • Machine types • Tools • Change over times/ capacity • Maintenance
	3.1.5 Production Costs ...student can classify costs created in a production environment	• Production costs (kinds of) • Overhead, change over costs, waste/ loss • fix / Variable / Direct / Indirect

	3.1.6 Trends and Developments ... student is introduced to new developments within a production environment that have not (yet) been included in the standard curriculum.	Guest lecture about trends. Potential topics are: • Refurbishing • 3D printing

CAS 3.2	Content and learning objectives	Sub-topics
Production, tactical, operational, functional organization		
	3.2.1 Management, organization, planning & control … organizes the planning and control (planning, managing, leading etc.) of the work within a functional organization, with regards to personnel, rules and regulations, risks and contractual agreements. … is able to determine the bottleneck in a production process using a OPT-model and redesigns this production process, so that the profit is optimized. … manages the work load of a production department and determines the production sequence using priority rules.	• Operational staff planning • KPI's • ICT • Organization structures • Management styles • OPT • TOC, CCR, Bottleneck • Goldratt • Drum-Buffer-Rope • Cash flow management • I/O schema • Work load control • Priority rules • Product oriented plants • lay-out decisions
	3.2.2 Economic aspects … is able to calculate the cost price of a product using the Job Costing method.	• Cost price calculation of functional organization • Job Costing

CAS 3.3	Content and Learning Objectives	Sub-Topics
Production, tactical, operational, product oriented organization		
	3.3.1 Management, organization, control and planning ... organizes the control (managing, planning etc.) of operations within a product oriented setting with regards to contracts, law and risks. … fills in a MRP I scheme based on a BOM and can take planning decisions where capacity shortages can occur. ...is capable of setting up an assembly line.	Control and monitor of production processes in a product oriented setting. Contents: • Operational staff planning • KPI's • IT • Organization structures • BOM • MRP I • ATP, CTP • Scrap, Allocated, Safety Stock, Scheduled receipt • Exception messages • MRP II • Line balancing • Lay out • Supply Strategies (Kanban, two bin, JIT en JIS) • Mixed model lines • Learning curves • Time studies
	3.3.2 Economic aspects …can calculate the cost price with the method of process costing	• Calculation of cost price in a product oriented setting • Process costing

CAS 3.4	Content and Learning Objectives	Sub- topics
Tools		
	3.4.1 Project work ... is able to translate the recommendations from the project research into a implementation plan.	• Create implementation plan • activities and responsibilities • Risk Analysis • Phasing
	3.4.2 Stochastic models and queuing theory …is able to analyze and optimize the throughput time and queuing time, based on a stochastic model, in a production company.	• Markov chains and queues • Effects of variation and utilization rate on throughput time (Little's law and Polaszek) • Models (M/M/1) / (M/N/1) etc.
	3.4.3 Quality Control …is able to construct a confidence interval forμ, p and σ …is able to carry out a hypothesis test for μ, p and σ …is able to carry out statistical process control using control charts, capability analysis, and acceptance sampling	Based on a logistics problem • Hypotheses test for µ • Hypotheses test for µ1 and µ2 (f.eg. machine 1 vs machine 2 / week 1 vs week 3, original situation vs. new situation (after simulation). • Hypotheses test for p • Six Sigma
	3.3.4 Project Management … is capable of determining the throughput time in a project(network) and shortening it, calculating and balancing capacity in these networks and taking into account uncertainty in the duration of network activities.	• Calculation of throughput time (also PERT) • Critical path analysis • Total Float / Free Float • Multi-Project • Capacity restrictions • Calculate probabilities that path is faster or slower
	3.4.5 Linear programming … student is able to evaluate linear programming problems	• Determine a production planning/ production mix with LP • Sensitivity analysis

4.1 Texts and Resources

The video material (and presentations, if any) will be made available on the Portal.

Books used in the semester:

- Bhimani et al.; Management and Cost Accounting;
- Dooley (2005): “Logistics, Inventory Control and Supply Chain management”, a publication of the American Agricultural Economics Association, Vol. 20(4) pp. 287-291
- Jacobs, Chase & Aquilano, Operations and Supply Chain Management;
- Prem S. Mann, Introductory Statistics;
- Reichhard, Holweg, “Lean distribution: concepts, contributions, conflicts”, *International Journal of Production Research*, Vol. 45(16), pp. 3699–3722;
- Robbins, Coulter,Management;
- Visser and Van Goor, *Logistics: Principles and Practice*;

5. Examination and assessment

The overall grade for passing a 5 ECTS module must be ≥ 5.5. There will be one resit for the exams.

Considering the group parts: the lecturers will take an individual effort and individual knowledge into consideration when grading the project/ modules. If applies that a certain student knows less about the content he could fail individually. Then he has to retake the part he failed.

In the Dutch system 10 is ranked as the highest, 0 as the lowest. All exams must be past with an equal of 5,5 or higher.

CAS	Assessment	Group/ Individual	Weighting	Assessment Scale
1	Written Exam	Individual	100%	0,1,2,3,4,5,6,7,8,9,10
2	Written Exam	Individual	100%	0,1,2,3,4,5,6,7,8,9,11
3	Written Exam	Individual	100%	0,1,2,3,4,5,6,7,8,9,12
4	Written Exam	Individual	100%	0,1,2,3,4,5,6,7,8,9,13