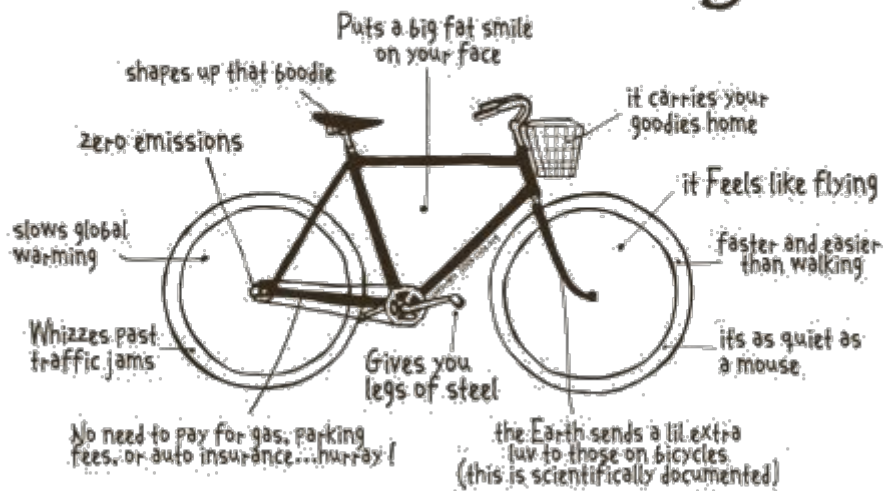


Benefits of a Bicycle



The Bike Factory

Focus area: economics

Period 3 year 1, Full-time

Version 1.1

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(with contributions from other IE&M instructors)

Table of contents

TABLE OF CONTENTS	2
1 INTRODUCTION	3
1.1 PROBLEM SITUATION	3
1.2 PROBLEM STATEMENT	3
1.3 ASSIGNMENT	3
1.4 TWIN OBJECTIVES OF THE PROJECT	4
1.5 PROJECT MILESTONES	5
2 PROGRESS DOCUMENTS	6
2.1 PROGRESS DOCUMENT 1 – ACTION PLAN (PROJECT PLAN)	6
2.2 PROGRESS DOCUMENT 2 – FROM CLIENT REQUIREMENTS TO PROTOTYPE (ALTERNATIVES)	8
2.3 PROGRESS DOCUMENT 3 – INVESTMENT SELECTION	10
2.4 ASSESSMENT DOCUMENT, FINAL RECOMMENDATIONS	13
2.5 COMPANY VISIT	14
2.6 REFLECTION DOCUMENT	15
3 COURSE SUBJECTS IN THE PROJECT	16
3.1 BUSINESS ECONOMICS	17
3.2 CORPORATE SOCIAL RESPONSIBILITY	19
3.3 MATHEMATICS & STATISTICS	21
3.4 INTRODUCTION RESEARCH SKILLS	22
3.5 PHYSICS	24
3.6 MANAGEMENT & ORGANISATION	26
3.7 GIVING PRESENTATIONS IN ENGLISH	29
3.8 TECHNICAL INNOVATIONS	31
3.9 MARKETING	33
3.10 COMMUNICATION	35
4 ANNEXES	37
4.1 INFORMATION FOR THE PROJECT	37
4.2 PROJECTBOX AND SUBMITBOX	39
4.3 RUBRIC - FINAL GRADING FORM	40
4.4 EXAMS AND ASSIGNMENTS	41
4.5 SOME ADDITIONAL SEARCH TIPS FOR IE&M STUDENTS	42
4.6 MUTUAL ASSESSMENT FORM FOR IE&M PROJECT	43

1 Introduction

In period 3 the focus is on the economic aspects involved in the work of an industrial engineer. Learning is achieved through a project to be carried out in a student study group.

During this period the student serves as an industrial engineer assisting a bicycle manufacturer that is restarting after a bankruptcy; this process largely revolves around various aspects of the design of a new bicycle. This involves becoming acquainted with many industrial engineering and management aspects in the bicycle factory and the relationships between them. The main emphasis is on the economic aspects and the application of industrial engineering techniques. Here, too, the attention is largely focused on the process used to perform the work.

During the project the group fulfils the role of advisor. The advice concerns calculating the financial consequences after a restart, and as part of this process you will be designing a new bicycle. The advice covers a wide range of topics, including: investment selection, target group choice, design, cost budgeting, cost price, quality, CSR strategy, marketing mix and the organisation. The core competences for this period are therefore: **Analysing, Designing, Managing and Advising**.

1.1 Problem situation

Sepeda NV is a bicycle manufacturer that has always focused on the Dutch market, with the production of one type of ladies' and men's bicycle. The company was declared bankrupt on 1 January 2017. The company is planning to restart, making it necessary to consider how this can be achieved, which assets can be transferred from the bankrupt company and which employees can be retained.

1.2 Problem statement

As indicated in the problem situation, the top management of Sepeda wants to restart the company and wishes to immediately investigate whether it is possible to offer a new bike to a new target group.

1.3 Assignment

The assignment for the project group is to draft an advisory report for the top management concerning how this new bicycle should be brought to market. The advice should cover both the commercial aspects and the technical/innovative aspects. All the recommendations must be supported with adequate financial underpinning. Additional information about Sepeda that will be needed to complete the assignment can be found in annex 4.1.

Sepeda company was declared bankrupt on 1 January 2017 and wants to make a new start. To achieve this restart Sepeda must bring a new bike to market. The top management of Sepeda has asked for **recommendations** concerning the type of bicycle and how it should be positioned in the market at a particular price. The customer requirements for the selected target group must therefore be determined. These client requirements must be developed into a concrete product. It is also necessary to specify the machinery that will be needed for the production of this bike. A financial

analysis of the associated investments, costs and profits must be prepared, important aspects of which are the investment selection and a profit ratio analysis.

Established parameters for these recommendations are:

1. The company wants to employ a corporate social responsibility (CSR) strategy. The company wants to project an image that conveys concern for CSR.
2. The CSR strategy must be clearly reflected in:
 - The design of the bike (material choice).
 - Energy conservation or alternative energy sources used in the production of the new bike.

The client requires that at least the following be addressed in the final recommendations:

- How are the client requirements translated into product specifications and what prototype can be made from these?
 - What machines will be needed for production of this new bike?
 - What will the power and compressed air requirements be (quantity and specifications)?
 - Human consequences of production in terms of safety, hygiene, etc.: health and safety law.
- How should the bike be positioned in the market in terms of branding and pricing?
 - What will Sepeda's CSR strategy be, based on a stakeholder analysis, and how will this be put into practice in terms of the product design and energy efficiency of the process?
 - Financial: investment selection analysis and impact on profitability.
- What specific measures will be taken to reach the selected target group and what instruments will be used to achieve this (promotion and channel selection)?
- Provide insight into the interrelationship between the various disciplines.
- Present a 3D printed prototype of the bicycle.

The final recommendations will be submitted in the form of a **report**, addressed to the director of the company. The report must be logically organised (broken down by theme) so that it is clear to the director why your group's recommendations are sound. After reading the report the director must be convinced that it is wise to proceed with plan proposed by the project group. The recommendations must be explained in the form of a **presentation**.

1.4 Twin objectives of the project

The objective of this project is two-fold: you solve a fundamental problem and simultaneously develop skills that contribute to your development towards becoming an industrial engineer.

Content objective

Prepare a thorough analysis of bringing a new bike (prototype) to market. This analysis must lead to recommendations to the top management of Sepeda, an important aspect of which is the financial viability.

The student can:

- draw up an action plan, taking into account the recommendations that are to be given (This must address the situation, problem statement, objective and assignment.)
- work out the action plan by following a research model
- see the correlation between client requirements and product specifications (a new bike)
- quantify, calculate and present the resulting consequences such that decisions can be taken based on them
- find and process information in the project assignment, focused on a limited area of research
- formulate recommendations to the management in a form appropriate to the situation (presentation or report)

Developmental objective

In this project the focus is on the competences analysis, design, management and advisement. You conduct a market analysis and use this to develop a prototype. You work with your study group to design a new bike, which involves making a prototype and providing the supporting financial data. This design is intended to lead to a set of convincing recommendations for the top management that will serve as the cornerstone for a restart of the company.

1.5 Project milestones

The table below shows the major milestones of the project. This provides you with a week-by-week overview of when the deliverables are due and when you should have worked through particular subject matter.

Deliverable	Week									
	1	2	3	4	5	6	7	8	9	10
PD 1	■									
PD 2			■							
PD 3						■				
Assessment document								■		
Research skills								■		
Company visit 3			■	■	■					
Exam CSR 3				EX						
Exam Business Economics 3							EX			
Exam Maths/Stats 3										EX
M&O 3								TA		
English 3								TA		
Physics 3									TA	
Reflection document								■		

For the requirements for the progress documents and the reflection document, see chapter 2.

The requirements for the **tasks (TA) and exams (EX)** are explained for each course individually in chapter 3. The exams in the table above are individual exams. While the project tasks are performed in groups, the associated exams are taken individually.

2 Progress documents

The following rules apply to all progress documents:

- The group itself is responsible for preparing a detailed schedule for the progress documents. The group discusses the schedule with the mentor on a weekly basis.
- All progress documents must be submitted to each of the involved instructors and the project coordinator via the ProjectBox (see annex 4.2). When progress documents are submitted they must be labelled with the group number, the authors' names and student numbers and the progress document number (see submission criteria for each PD).
- For progress documents 2 and 3 students must give a presentation during the feedback. During feedback sessions, students are expected to be able to defend the choices made. All members of the group are required to be present!
- All students from the project group must present at least once during this period. Presentations are made for progress documents 2 and 3 and for the final document (keep in mind the advisement competence).

2.1 Progress document 1 – action plan (project plan)

Assessors: Project Coordinator and Mentors

Write an action plan that will lead to your final recommendations. This action plan must include all the aspects related to these recommendations.

Project plan

During this innovation project the project group progresses through certain stages. These stages must be worked out in a project plan. This serves as a guide for the group's approach and is also a commitment by the group to the client.

The project plan has two purposes. First of all, the plan indicates which substantive goals are to be achieved by the group and the individual student. In addition, the plan must specify how the group intends to work together so that everyone has the same expectations. Use the project plans from the previous periods for this.

Various tools are to be used to prepare this project plan.

Relevant search terms:

5W2H, mind map, Belbin, team contract, Gantt chart, risk analysis, backcasting

Submission criteria

Complete project plan, containing not only the approach to the Sepeda assignment but also:

- Supporting courses and tasks (where possible, describe connection to the project)
- Weekly planning
- Individual study activities (e.g. exam preparation)
- The use of the provided tools

Research model

- Sheets 'Lecture 1 – Technical Innovation' (Technical Innovations) on N@tschool.

Relevant website

www.biep.nu

This website links to the search engine called 'biep.nu'. Via this search engine you will have access to all documents available to Fontys students. In annex 4.5 you will find important information regarding useful search terms for The Bike Factory.

Shape:

A project plan must be submitted as a single document. Submit the document to your mentor and the project coordinator via the ProjectBox.

The submission deadline is before 12:00 noon on Friday 10 February 2017 (week 1).

The document will be assessed by the mentor. This takes place during the mentor hour.

You are expected to document the feedback you receive on PD 1 in the form of minutes. You send these minutes to your mentor and the project coordinator via the ProjectBox (put 'Project 3_F1XX_minutes_PD_1' in the subject line).

2.2 Progress document 2 – From client requirements to prototype (alternatives)

Assessors: Course lecturers Technology and Marketing and the project coordinator.

The client expects to see the following points addressed in this progress document:

1. Who is the client?
2. What are the client's requirements for a bike?
3. Developing customer requirements into design criteria and making a prototype bike.

The client and the approach:

A different product (or product variant) is required to meet the needs of each target group. To define a target group, more detailed information must be obtained about various **segments**. Describe **three** segments so that one target group can be chosen. The segments must be described on the basis of a **persona**! At least the following aspects of this persona must be investigated: Age, Sex, Region of residence, Stage of life, Income, Education and Lifestyle. In addition, the group must investigate three other relevant aspects about each segment.

Insight must be provided into the choice of the target group; the three segments must be assessed based on a number of criteria. It is important to determine the size of each segment (measurable), how easily the potential customer can be reached (and how: through which specific media channel) and what the growth is in each segment. Based on these and other criteria, a choice of target group must be made using a matrix so it is clear for the client.

For the chosen target group you must give thought to what advantage you are seeking by targeting this customer (which aspect are you going to capitalise on).

Sepeda already has some segments in mind that could be chosen as target group for a new bike: Commuters (car/public transit), travellers, people with children, athletic cyclists, racing cyclists, holiday cyclists, mountain bikers, shopping traffic, children, elderly people, environmentally conscious cyclists, cyclists for local transport.

The question that Sepeda still has is what the customer requirements are for the target group your advisory group has selected. Understanding of the **customer requirements** is needed to ensure that the design fulfils the needs of the customer.

One of the four Ps that form the marketing mix instruments is the (as yet to be investigated) Product; see next section. The complete marketing mix is worked out in detail in the final document.

From client requirements to prototype

After the client requirements have been determined, these must be worked out into design criteria that form the basis for the product that is to be developed. Based on the design criteria for the bicycle, a minimum of five possible bicycle frame models must be considered. While looking at the design criteria it is also a good idea to consider the functions of the bike. A morphological overview can be made from the analysis of the design criteria. Ultimately a single model is chosen and a prototype version of it is created using a 3D printer.

Submission criteria:

No specific report is to be made for this progress document. The progress is presented in the form of a presentation to the assessors; it may be up to 10 minutes long. The following elements must be present:

- Target group selection, consisting of:
 - Specific target group description
 - Overview of client requirements, with an explanation of at least one of the tools that were used
- Design of technical innovation:
 - Design criteria, using QFD to substantiate how you arrived at the design criteria.
 - Functional analysis
 - Morphological overview leading to selection of bicycle parts.
 - Design of the bike (3D sketch in SolidWorks).
- Presentation of one prototype.

The 'communication' seminar prior to the submission deadline offers the opportunity to obtain coaching for your PD 2 presentation. It is also important that all group members are present and that you bring with you a presentation you have made ahead of time.

The submission deadline for draft presentation and accompanying documentation (for clarification of underlying calculation) is before 12:00 noon on 23 February 2017 (week 4).

Submit one copy to each evaluating instructor, mentor and the project coordinator via the ProjectBox.

The presentation is examined by the various course lecturers prior to the presentation. It is presented to the course lecturers during the 'feedback' session. After the group has presented the results, questions are asked and feedback is given.

You are expected to document the feedback you receive on PD 2 in the form of minutes. List the names of those who presented in the minutes. You send these minutes to the evaluating instructors, project coordinator and mentor by uploading the document to ProjectBox (put 'Project 3_F1XX_minutes_PD_2' in the subject line).

This feedback must be incorporated into the final document.

Research model

- Sheets 'Lecture 1 – Technical Innovation' (Technical Innovations) on N@tschool.

Content model

- Book Marketing, An Introduction by Gary Armstrong and Philip Kotler, chapters 1,5,7,8,9 and 12

Relevant search terms:

Product, product characteristics, latent need, persona, target group description, product differentiation, AIO dimensions, positioning, morphological overview, function analysis, QFD, design criteria, prototyping, technology exploration, technical solution and integrated design.

2.3 Progress document 3 – investment selection

Assessors: CHOT & EERT

The client would like to have the following questions answered in this progress document:

- What does Sepeda's Corporate Social Responsibility (CSR) strategy look like?
- What materials, machinery and provisions are required for the production of the bike?
- What is the energy consumption of the machinery, and how can 20% of this requirement be obtained through alternative energy sources?
- What investments are required, and are these wise investments?
- What impact will this investment have on the profitability for the coming two years?

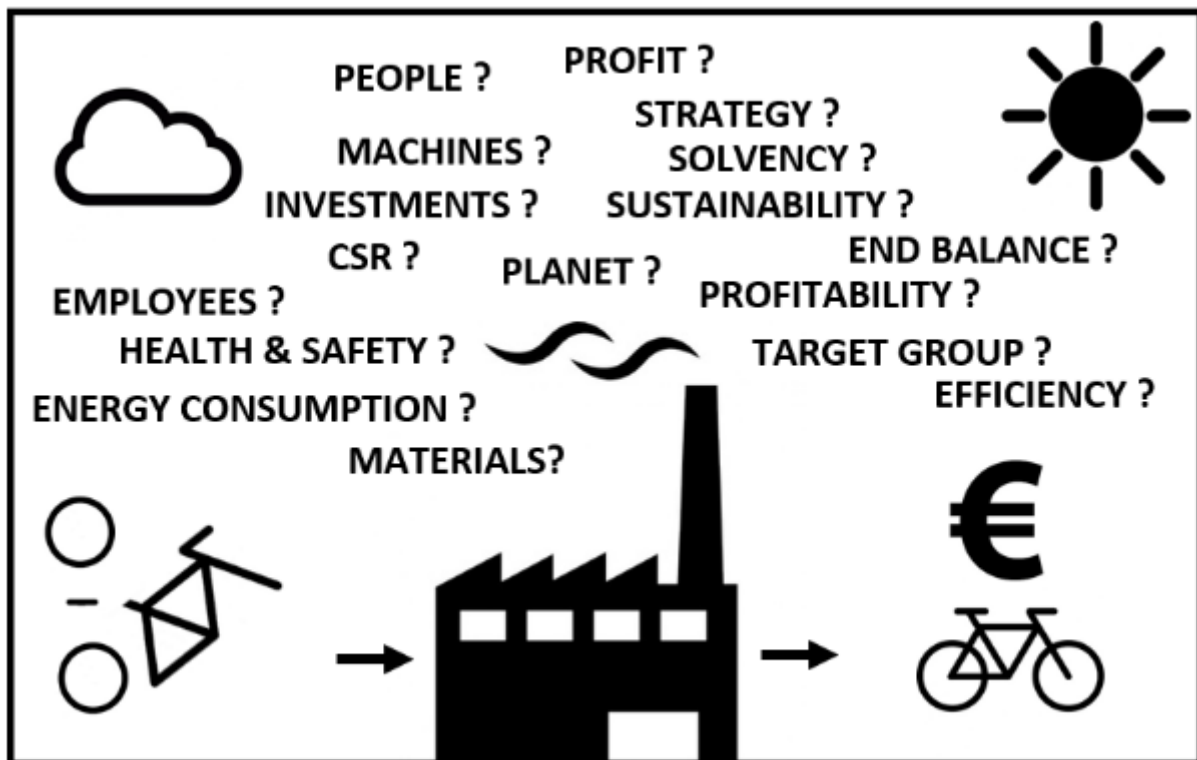


Figure 1: Terms for which answer must be given in PD 3

Corporate Social Responsibility strategy

How do you use a stakeholder analysis to develop a CSR strategy based on the aspects people, profit and planet for the short, medium and long term? The client is also interested in the project group's vision and the relationship between the CSR strategy and the organisational objectives.

Necessary materials, machinery and provisions

Select some materials that need to be assessed from a CSR perspective. Once this choice has been made, thought should be given to the necessary machinery and provisions¹. When thinking about the provisions, remember to consider the compressed air requirements and the occupational health and

¹ Processing, capacity, purchase price, service life, maintenance costs (including a breakdown), square metres of floor space, operators (number of employees), energy consumption, compressed air (yes/no), air extraction (yes/no).

safety provisions. In addition, the client wants to retain as many of the employees who worked for Sepeda before the bankruptcy as possible.

Energy consumption and alternative energy sources

Once it is clear which machinery and provisions are required, it is possible to determine the annual energy consumption. The client wants at least 20% of this to be from sustainable sources. How should the client do this?

Investment and impact on profitability

The launch of this new bike requires investment in machinery, personnel and provisions. Sepeda wants the financial information underpinning this investment. Is this a wise investment? Sepeda also wants to know how long it will take to recoup the investment and whether the investment will meet the financial return requirements of the new organisation.

In addition to all of the above, Sepeda wants to know the opening balance sheet and the budgeted balance sheet at the end of years 1 and 2. The budgeted profit and loss account for the first two years is also crucial. The company wants an analysis based on solvency and profitability. When you prepare the opening balance from the 2016 final balance, decide which items can be carried over and which cannot.

Submission criteria

The emphasis for PD 3 is on **structure, consistency and completeness**. In PD 3 a presentation is also given by the students; this can be up to 10 minutes long. The following elements must be included in the presentation:

- Stakeholder analysis and CSR strategy
- Excel model with scenarios and initial assumptions (what-if analysis)
- Overview of required machinery and provisions.
- Risk assessment from a health and safety perspective.
- Investment selection based on payback time and net present value method.
- Analysis of solvency and profitability of the new bike.
- Visual presentation (figures) showing which decisions have been made (see example Figure 1).
- Substantiation of the assumptions.

In order to provide the groups with good feedback, each group must submit the following documents to each evaluating instructor, mentor and project coordinator via the ProjectBox.

- Concept Presentation
- Word document containing initial and final balance for years 1 and 2, and profit/loss account for years 1 and 2. Plus explanatory notes for the amounts in these overviews and key figures.

The submission deadline for these documents is before 12:00 noon on Thursday 23 March 2017 (week 6). Use the following names:

- 'Project 3 _F1XX_DraftPresentation_PD_3'
- 'Project 3 _F1XX_FinancialSummary_PD_3'

The presentation is examined by the various course lecturers prior to the presentation. It is presented to the course lecturers during the 'feedback' session. After the group has presented the results, questions are asked and feedback is given.

The 'communication' seminar prior to the submission deadline offers the opportunity to obtain coaching for your PD 3 presentation. It is also important that all group members are present and that you bring with you a presentation you have made ahead of time.

You are expected to document the feedback you receive on PD 3 in the form of minutes. List the names of those who presented in the minutes. You send these minutes to the evaluating instructors, project coordinator and mentor by uploading the document to ProjectBox (put 'Project 3_F1XX_minutes_PD_3' in the subject line).

This feedback must be incorporated into the final document.

Research model

- Sheets 'Lecture 1 – Technical Innovation' (Technical Innovations) on N@tschool.

Content model

- Book Basics of Financial management, An Introductory Course in Finance, Management Accounting and Financial Accounting, chapters 5, 7, 8 en 9.
- Reader Master budget and key ratio's part 1.

Relevant search terms:

payback time, discount rate, net present value, cash flow, solvency, debt ratio, profitability, return on assets (ROA), interest rate on debt and return on equity (ROE). Eco-design strategies, people, profit and planet. Wind energy, solar PV.

2.4 Assessment document, final recommendations

Assessors: CHOT & NOR

This last document includes the final recommendations to the management of Sepeda N.V. These recommendations are to be presented in the form of a business case, with the aim of convincing the management to follow the advice and implement the plan. These recommendations are written using the 'pyramid structure' which is an option when writing reports. It is also important that the text be written concisely. The content, as obtained from the preceding PDs and additional research, is organised thematically in chapters and sections. This is a stand-alone document, and the annexes are arranged and laid out in a reader-friendly way. The report is accompanied by a covering letter in which the document is presented to the clients.

Submission criteria

- Writing outline based on what you learned in the communication seminars
- Reporting method: Pyramid structure & Core-Elaboration-Conclusion principle
- Report (up to 15 pages main text)
- Annexes
- Must at least meet substantive project objectives (see section 1.3)
- Covering letter, presenting the offer, addressed to the Executive Board of Sepeda (project coordinator and evaluating communication lecturer) in accordance with the guidelines presented in the seminar.
- Everything is presented in a reader-friendly manner that is inviting to read.
- List of references with sources in APA format. (See also 'Research skills'.)

The submission deadline is before 12:00 noon on Thursday 6 April 2017. Submit to each evaluating instructor, mentor and project coordinator a copy of the letter and the report via the ProjectBox and **two hardcopy versions** to the project coordinator and evaluating communication lecturer.

Assessment

- Report, presentation and defence are assessed (see annex 4.3 with assessment guideline).
- Students bring the 3D printed bicycle with them to the final presentation.
- The students present the final recommendations and taken decisions in 10 minutes.
- The defence takes place after the presentation (10 minutes).
- Lastly, the final mark for the project is granted. In the case of a non-passing mark, the second chance moment will be discussed at a later time.

Sources

- Report Writing

Relevant search terms:

- Argumentative writing, writing tips, reasoning, signal words, structure

2.5 Company visit

Assessment

The assessment of the company visit assignment will be done by the mentor. Submit a combined **digital version** to the mentor concerned via the SubmitBox.

More information to be announced.

2.6 Reflection document

In the reflection document for period 3, four competences must be worked out in the form of a STARRR document. The core competences for period 3 are:

- Advisement
- Design
- Management
- Analysis

The assessment of these STARRR will include consideration of the sources you used. Therefore include at least two external sources. Use them as substantiation for your report, and include them in your sources list in APA style.

The assessment form will be made available on N@tschool in the course of the period.

Shape:

Submit the abovementioned assignments, bundled together as reflection document, to your mentor no later than 12:00 noon on Friday 7 April 2017 (week 8) via the **SubmitBox** and **by email**. The feedback follows in week 9.

3 Course subjects in the project

All the courses in the project contribute to the ability to answer the main question and sub-questions in the project. Should a subject not be directly related to this project, it is being taught now to enable you to gradually progress in your learning of the subject as your academic career progresses. You will find more information about this in the curriculum descriptions in this chapter.

This project involves the following course subjects:

- Business Economics
- Corporate Social Responsibility (CSR)
- Mathematics/Statistics

- Research skills
- Physics
- Management and Organisation (M&O)
- English

- Technical Innovations
- Marketing
- Occupational Health & Safety
- Communication

3.1 Business Economics

The course Business Economics 3 is very closely connected with the project. In this module the project group learns to apply investment calculations, based on a simple profit and loss statement, to the innovation project in period 3.

Programme	IE&M
Programme phase	Year 1, 3 rd period
Curriculum component	Business Economics 3
Classroom hours per week	4x 1 hour lecture, 4x 2 hours seminar
Credits	2 ECTS
Study load	56 SBU
Prepared/taught by	Mr. L. Sheikchote MSc
Effective date	06/02/2017

Objectives

Topic 'investment selection methods':

- The student understands the differences between earnings and cash flows and can calculate them
- The student can apply the investment methods such as payback period and average accounting rate of return (ARR)
- The student can determine and interpret the net present value (NPV) and internal rate of return (IRR) of an investment project

Topic 'financial ratio's':

- The student is knowledgeable about the concepts ratio analysis, capital adequacy ratios and profitability ratios
- The student can calculate and interpret various financial ratios such as the debt ratio and the return on invested capital, borrowed capital and total assets
- The student knows the limitations of (the use of) financial ratios

Prerequisite knowledge

There are no specific prerequisites for the course Business Economics 3.

Study material: selection and arrangement

The curriculum includes:

- Week 3, period 3: introduction and outline, chapter 15 and sections 16.1 and 16.2
- Week 4, period 3: chapters 7 and 8 and sections 9.1, 9.2 and 9.3
- Week 5, period 3: chapter 5 and handbook (see teaching and learning aids)
- Week 6, period 3: review and summary
- Week 7, period 3: EXAM
- Week 7, period 4: exam resit

Teaching methods

Lectures and seminars

Teaching and learning resources

- Brouwers, M.P., Koetzier, W. (2015). *Basics of Financial Management* (Third edition). Groningen/Houten: Noordhoff Uitgevers (Chapters 5, 7, 8 and 9, sections 9.1, 9.2 and 9.3, chapter 15 and sections 16.1 and 16.2)
- Brouwers, M.P., Koetzier, W., Leppink, O.A. (2015). *Basics of Financial Management, EXERCISES (Second edition)*. Groningen/Houten: Noordhoff Uitgevers.
- Weekers L., Bosboom R.P.J. (2011). *Handbook Master budget and key ratio's part 1*. (Reader on N@tschool).

Exams and assessment

This course is tested by means of an **individual exam**. This is a closed-book exam.

3.2 Corporate Social Responsibility

In the course 'corporate social responsibility' (CSR) we view the organisation strategy from a social perspective. The aim of most organisations is to make a profit. Organisations with this objective face a difficult question: What social costs are justifiable in the pursuit of profit?

This question comes up regularly in the media, for example recently at KPMG (which kept contractor kickbacks off the books), PGGM (which sold its interest in Israeli banks that financed Israeli settlements in Palestinian territory), IMTECH (which has done dubious things in Poland) and the debate concerning the bonus policies of various banks.

In this course we will learn about three aspects of a successful strategy for a socially responsible company: people, planet and profit. We discuss these subjects on the basis of examples, and place them in the social (sociological) context. This discussion of the social context follows on from the subjects psychology/sociology in periods 1 and 2.

Department	IE&M
Programme phase	Year 1, 3rd period
Curriculum component	Corporate Social Responsibility
Classroom hours per week	1x 1 hour lecture, 3x 2 hours seminar
Credits	1.5 ECTS
Study load	42 SBU
Prepared/taught by	T. van den Eertwegh, MSc, S. Spijkers, MSc
Effective date	06/02/2017

Objectives

The objectives of this course are:

Written exam:

1. The student can describe the following general concepts in their own words: CSR, Sustainability, Accountability, Transparency, Greenwashing, Globalisation, Externalising costs.
2. The student can describe the following concepts about stakeholders in their own words: Stakeholder Theory, Social contract, Management tasks.
3. The student can describe basic principles of corporate governance in their own words.
4. The student can explain the effects of an organization.
5. The student can explain the effects of globalisation.
6. The student can prioritize stakeholders.
7. The student can relate Polonski's analysis to Gardner's matrix.
8. The student can describe relations between the following concepts: sustainable development, environmental accounting, risk evaluation, triple bottom line, organizational goals, corporate governance.

Project:

9. The student can apply Polonski's analysis related to Gardner's matrix to the project Bike factory.

10. The student can give examples of how the relation between concepts (sustainable development, environmental accounting, risk evaluation, triple bottom line, organizational goals, corporate governance) is relevant to the Bike factory.

Prerequisite knowledge

No specific prior knowledge is required for this course.

Study material: selection and arrangement

The lecture provides an overview of the topics covered in the course. The three subsequent seminars will include discussion of which CSR concepts have been sought out. Finally, their applicability to the project 'The Bike Factory' will be sought.

Teaching methods

This course uses online material which will also be used in the 2nd year.

Exams and assessment

The corporate social responsibility course ends with an exam that consists of open and closed questions. The seminars also serve as preparation for the project report.

The exam is scheduled in week 4. A second attempt will be provided in the following quarter also in week 4 and will have a similar form and content.

3.3 Mathematics & Statistics

In this module the student's basic knowledge of mathematics is expanded. The emphasis is on exponential and logarithmic functions and differentiation.

Department	IEM
Programme phase	Year 1, 3rd period
Curriculum component	Mathematics
Classroom hours per week	6 x 2 hours
Credits	2 ECTS
Study load	56 study hours
Course author/instructor	K. de Meijer, P. Baas
Effective date	6 February 2017

Objectives

The learning objectives are:

- You know what power functions and polynomials are.
- You know what exponents and logarithms are.
- You can use them to perform calculations.
- You can solve exponential and logarithmic equations.
- You are familiar with exponential and logarithmic functions.
- You know what a difference quotient is
- You can differentiate a function
- You know the calculation rules for differentiating
- Using the derivative you can calculate the extreme values of a function and draw the tangent line to the curve

Prerequisite knowledge

Basic knowledge of mathematics. Mathematics period 1

Teaching methods

During the lecture theory and exercises alternate.

Teaching and learning resources

Jan van de Craats & Rob Bosch, *All you need in maths!*

Exams and assessment

Active participation in the lesson is a requirement. The module is concluded with an individual theory test.

3.4 Introduction Research Skills

To enable you to successfully complete your HBO [higher vocational] course it is important to have good research skills. However, this is not a skill that you can master from one day to the next, so in this project we start by spending time on this. What you are about to learn forms the basis for what you will be learning in project 4 and the next few years in research skills.

Department	IEM
Programme phase	Year 1, Q3
Curriculum component	Introduction to research skills
Classroom hours per week	2 HC 100 min
Credits	1 ECTS
Course author/instructor	Els de Maeijer, Marjo Janssens
Effective date	06-02-2017

Objectives

At the end of the period the student has the knowledge, skills and attitudes described below. The skills and attitude are trained individually in the library; the knowledge, will be assessed per group with the final report. A visit to the Fontys library is a mandatory part of this course.

Knowledge

- Physical and digital information sources via media centre
- The concepts validity and reliability of sources
- What plagiarism is
- APA reference standards
- Effect of proper use of sources for clients

Skills

- Ability to search independently in above-mentioned information sources
- Ability to select reliable sources independently
- Assessing the relevance of sources for an assignment
- Integrating a source in reporting

Attitude

An inquisitive and critical attitude towards sources, based on the ambition to learn more and to carefully substantiate and support your own opinion. Showing respect for other people's work by not taking anything over intentionally or unintentionally without the correct references.

Prerequisite knowledge

No specific previous knowledge is required for participation in the lecture for this course.

Teaching and learning resources

First the terms validity and reliability will be discussed. The effects of using good reliable sources in project 3 and your future career will be explained. The teacher will also introduce the assignment for this course. From week 2 till week 7 the Fontys library is accessible for finding sources.

Exams and assessment

An introductory lecture of 2 hours and a mandatory visit to the Fontys library. Near the end of the project the final report of project 3 will be assessed on the above mentioned knowledge in collaboration with communication teachers. For specifics, check assessment Research Skills on N@tschool.

3.5 Physics

Department	IE&M
Programme phase	Year 1, 3rd period
Curriculum component	Physics 3
Class contact hours	7 x 2
Credits	2 ECTS
Study load	56 SBU
Course author/instructor	A.P.M. van de Ven, C de Meijer, M. v. Mensvoort
Effective date	06-02-2017

Objectives

Power generation in the house of the future is a topical subject (e.g. solar energy, cogeneration, heat pump and wind turbine). In this project we will take a closer look at the generator as a possible component of a wind turbine. The bicycle dynamo is examined as an AC generator, with special focus on efficiency measurement. Topics covered include incoming mechanical and outgoing electrical power, force determination using a strain gauge and amplification of measurement signals. The various measurement signals are read into a PC using a self-constructed arrangement (analogue-to-digital conversion) for further processing in Excel.

Knowledge

The student has:

- knowledge of basic physics:
 - series/parallel resistor circuits
 - DC and AC electric power
 - ideal/non-ideal ammeter and voltmeter
- knowledge of the basic concepts of alternating current theory:
 - amplitude
 - frequency
 - period
 - effective voltage and current
 - Wheatstone bridge
- knowledge of general basic concepts of mechanics and electronics:
 - force
 - work
 - power

Skills

The student can:

- calibrate a sensor (strain gauge)
- interpret a calibration graph (determine sensor sensitivity)
- use a voltmeter/ammeter (AC/DC)
- build a circuit from a wiring diagram on a breadboard
- write a technical report and/or measurement report (final report)
- Working with Excel: formula editor/graphs

Attitude

The student...

- demonstrates good planning
- has a sense of responsibility to the group
- is proactive (preparation)
- is able to work independently

Prerequisite knowledge

Basic Physics (Physics 1)

Basic Mathematics (Mathematics 1)

Subject matter – selection and arrangement

The subject matter includes topics related to efficiency determination of an AC generator, force, power (both mechanical and electrical), amplification and efficiency; see specific objective knowledge.

Teaching methods

- Two lectures will be given.
- In three practicums students will familiarise themselves with the alternating current generator (dynamo):
 - Practicum 1: Wheatstone bridge and amplifier circuit (simulation with EWB)
 - Practicum 2: Determining relative stretch and force in a member (calibration strain gauge)
 - Practicum 3: Efficiency determination dynamo

Teaching and learning resources

All the material can be found on N@tschool:

- Presentations to accompany lectures (PowerPoint)
- Practical handbook (PDF)

Exams and assessment

Important assessment aspects for Physics 3:

- Attendance at practicums (**attendance mandatory**)

Make-up practicums scheduled for end of period 3

- Preparation (**individual**)

During the second practicum, preparation will be individually quizzed and assessed with a mark. In the case of insufficient preparation, opportunity for resit during make-up practicum at the end of period 3

- Report (**group**)

Each group will submit a single report for all the completed practicums, which will be assessed with a mark. Feedback by email.

If submitted within a week after the last practicum, an improved version may be submitted if the original **does not receive a passing mark**.

- Final assessment

The final assessment is a weighted average:

- Preparation quiz, **weight=1**
- Report, **weight=2**

Resit

If the marks for Physics 3 are too low the exam commission can consider a resit examination.

The resit is scheduled for August of the following academic year.

Note: The Physics 3 resit will be conducted in the form of an open exam, with the preparation questions for the practicums and the report considered as teaching materials.

3.6 Management & Organisation

A number of decisions must be taken in the project 'The Bike Factory'. So how do you go about doing this? With whom, using which process and on the basis of what? During this course you are going to answer these questions, with an opportunity to practice when you are faced with two key choices in the project that each require a carefully considered (group) decision.

Department	Industrial Engineering & Management – Full-time
Programme phase	Propaedeutic phase, year 1, 3rd quarter
Curriculum component	Management & Organisation (Organisational Science)
Task	481B3MO, Decision Making Task
Contact hours	1 hour x 1 week 2 hours x 3 weeks
Study load	28 hours
Credits	1 ECTS
Prepared/taught by	Jim Prince

Objectives

The student knows...

- ...the decision-making concepts covered in the lectures and the book
- ...the theories presented in the course
- ...the difference between rational and 'irrational' decision-making: decisions from the head or the heart (follow your heart, use your head)

The student understands...

- ...that you approach a decision concerning a pre-established goal and a decision concerning a goal that has yet to be determined in two (very) different ways
- ...the difficulties and limitations you encounter for each of these approaches

The student can...

- ...switch between propounding and listening attitudes during conversations
- ...consciously and effectively handling fundamental questions
- ...provide a balanced presentation of arguments and considerations that have led to a decision in a written report

Prerequisite knowledge

The student has sufficient basic knowledge of industrial engineering and management to be able to reflect on the related business choices, in particular with regard to the organisational science, production technology, CSR (parallel) and business economics.

Subject matter selection and structure

We are introduced to two more or less opposite kinds of decisions: rational and intuitive decision-making processes. You would likely prefer to make all decisions in a completely rational way, but in practice we know that we are unsuccessful – or only partially successful – at accomplishing this.

Moreover, the nature of the decisions to be taken differs: some are taken with the head (how many machines will I deploy here) and others with the heart (am I going to try to win over this girl). Keep in mind: ‘decisions with the heart’ are made even in the business world! Consider CSR-related matters (what do we do with this ideal Indian subcontractor who turns out to employ children?) and positioning issues in the marketing (‘who’ do we want to be as brand?).

Depending on the nature of the decisions to be taken, different decision-making processes are more or less ‘appropriate’.

Teaching methods

For period 3, one lecture and two seminars are planned, in which first all together and later in smaller working groups we will discuss chapter 7 ‘Decision-making’ and more from the book by Marcus and Van Dam. The subject matter will be presented in the first, plenary lecture. Then, during the two seminars, we will take a more substantive look at and engage in some practical exercises involving the different forms of decision-making.

Teaching and learning resources

- PowerPoint presentations will be put on N@tschool
- During the series several articles will be made available for study.
- In the book we will focus on chapter 7.

Exams and assessment, task M&O 3 (481B3MO)

Your assignment will be to choose two group decisions in this project that you will explain in detail and justify. One of these two decision-making processes must be an Instrumental decision-making process, and the other must be a more intuitive, Fundamental decision-making. In the space of a brief presentation that has to be edgy, where you will explain for each decision-making process: how you came to the decision, how you discussed it within the group (for example) and which model (or rationale) lies behind it. This last aspect is a mandatory requirement: you must select and apply a model for both decision-making processes. This may be a model presented in the lecture/seminars (e.g. minimax, maximin) or – preferably! – a model you have chosen yourself: countless decision-making models are available online (via Google or the media centre). Pick one that fits the issue at hand.

- This assignment should be completed in the project group.
- What is important here is that you provide insight into how you arrived at the decision. More important still is the reason you chose the system you used.
- no later than told in the lecture.
- The appraisal guidelines for the assessment are as follows:

- **'A' (Assignment):** Have the essential requirements of the assignment been fulfilled? Yes: **5 points**. (No: no points)

Fundamental decision-making process explained in detail?	
Instrumental „ „	
Decision-making process substantiated?	
Explanation how decision was arrived at	
A model – instrumental	
A model/approach – ‘Fundamental’	
Assignment requirements fulfilled?	

- ‘Extra’ points can be earned for:
 - **'L' (Language):** The paper is to the point, gripping, and the text is straightforward with a clear structure. Balanced formulations, containing well-chosen figures of speech where necessary/appropriate, reinforced by a moderate amount of imagery and free of spelling, style and punctuation errors: Add **1.5 points** (maximum).
 - **'L' (Logic):** The arguments are logical, airtight (no fallacies) and convincing. It is not only made clear to the reader how the decision came about; he is also persuaded by the ‘rational’ behind the decision-making process: Add **1.5 points** (maximum).
 - **'E' (Edge):** The text has an ‘edge’. In other words: it has a distinct individual style, in a positive sense. This demonstrates the group's creativity, showing it to be capable of applying established theory in a particularly appropriate and somewhat original way: Add **1.5 points** (maximum).
- All of the above total to a maximum of 9.5. However, the instructor has the discretionary authority to grant tens. Submissions that have not earned any points in the categories ‘bonus points’, ‘A’, ‘L’ or ‘E’ will not receive a passing mark. Underperformance in these categories may also lead to a mark of less than 5 for a submission that nevertheless meets the basic requirements of the assignment.
- If the assignment is assessed as inadequate, the group will have one opportunity (within the current period) to improve the paper. In this case the group will be invited for a feedback session. The entire group must attend.

● **Note: If the first presentation is not with a complete group or not on the requested level on the scheduled time, the group gets a second change that has to be finished within the current project period.**

3.7 Giving presentations in English

Bachelor	TB (481B3ENG Engels 3) IE&M (481E3ENG English 3)
Study phase	Year 1, Q3
Subject	Giving presentations in English
Contact hours	1 lecture (50 min), 1 follow-up workshop per three student groups (100 min)
Credits	0.5 EC
Design and execution	Ms. Vera Hermans and Mr. Henk Eppenhof
Starts	February 2017

Objectives

Students should be able to prepare and give a short presentation in English on a business subject after following the introductory lecture. The objective of the course is that students develop an awareness of their individual English language skills by being judged on their level of English pronunciation, English grammar and English fluency. This awareness is needed to determine individually whether extra investment in time and effort is required (in comparison to fellow students) for the study of English. In addition, students should further develop their understanding about what kind of content positively contributes to a business-like presentation. The English language objective is the primary objective of the course, the objective with regard to content is secondary. For aspects of grading, please see Assessment and grade below. The grading is for actual levels of achievement, not for the awareness mentioned above.

Knowledge:

Students do not need any prior knowledge, apart from the requirement of knowing how to use software for making a business-like presentation, such as Powerpoint or Prezi.

Skills :

Students need a basic level of English language fluency to be successful in this assignment (between B1 and B2, Common European Framework of Reference). Detailed information on this level is available on the website of the Council of Europe. Click this link (<https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168045bb52>) for information about the CEF levels. It is safe to say that students who attended secondary school and scored a passing grade for English, would meet the B1/B2 requirement.

Attitude:

We expect students to show a positive attitude in wanting to show their best English language skills in an interesting performance. Of course, some independence is also expected, because students prepare their group presentation without their teachers present.

Course will include

- Introductory lecture explaining the requirements for successful completion
- Preparation in project group of group presentation
- Delivery of presentation during follow-up workshop

Didactic approach

- Introductory lecture (50 min)
- Three project groups combined take part in an additional workshop (100 min) during which they present themselves and also give feedback on two other groups

Educational material

- Online English language dictionaries, such as Collins or Longman
- PowerPoint of the introductory lecture (on N@tschool)

Assessment and grade

- Students will receive peer feedback from their fellow students and also feedback from their English teacher
- The English teacher will grade the performance of all group members. The grade will be the appreciation for the following aspects (all equally important)
 - Pronunciation of English
 - Grammatical level of spoken English
 - English fluency
 - Business-like and informative content

All four aspects will be dealt with in more detail in the opening lecture. The grading form will also be shared and discussed with the students during the opening lecture.

- All students will be graded according to their individual performance. Students who do not reach an acceptable standard will be given the opportunity to give their (improved) presentation at a later date

3.8 Technical Innovations

Technical innovation is a long and intensive process which, depending on the client, may differ in terms of starting points and goals. As a designer you are often only involved in part of the entire innovation process, but you play an important role in defining the design and examining the technical feasibility. We call the process that you, as a designer, go through to achieve this 'Designing technical innovations'.

These supporting lectures give you tools you need to create an improved design for a bicycle. We examine aspects of the design methods for a technical product, developing client requirements into an actual prototype. The lectures are supported with seminars on modelling, using a 3D CAD package and, if possible, 3D printing of a scale model of the designed bicycle.

3x 1h lecture for all students and 3x 2h seminar per five groups.

Department	IE&M
Programme phase	Year 1, 3 rd period
Curriculum component	Technical Innovations
Classroom hours per week	3 (weeks) x 1 hour + 3 (weeks) x 2 hours
Credits	In project
Study load	15 hours
Prepared/taught by	Twan Lintermans
Effective date	06/02/2017

Objectives

In this project the focus is on the competences analysis and advisement. You conduct a market analysis and use this to develop a prototype. You work with your study group to design a new bike, which involves making a prototype.

Knowledge

You can utilise problem exploratory methods, have insight into the use of QFDs, can determine client requirements and design criteria with appropriate tools. You gain an understanding of rapid prototyping techniques.

Skills

Knows the basic elements of SolidWorks, can design parts in part modelling mode and create a composition of these in assembly mode. You can convert the 3D model to a machine file suitable for a 3D printer.

Attitude

You have an inquisitive mindset and the intrinsic motivation to tackle problems in a proactive way.

Prerequisite knowledge

Prerequisite knowledge includes the Production Technology lectures and the corresponding lessons in Workshop Technology and the Drawing Skills lectures. These provide an important foundation for participation in this course.

An interest in technology and an inquisitive nature are also beneficial!

Curriculum

The curriculum includes:

Strategies for arriving at technical innovations through a number of phases.

Drawing and designing with SolidWorks (including the use of features such as: sketching, extrude boss/base, extruded cut, revolve, patterns) to create a 3D model. You learn to work using both part and assembly mode and to convert 3D model data (post processing) to machine data. Specifically you will go in-depth on drawing a model bike, which will be printed in PLA or ABS on a 3D-printer later in the project.

Teaching methods

Lecture and interactive seminar.

Teaching and learning resources

- We will work with 3D modelling software SolidWorks; an installation DVD and licence will be made available by the instructor. You will need your laptop (with Windows OS) during the seminars. If you do not have one, you can use the PCs in the media centre.
- The book *Ontwerpen van technische innovaties (Design of technical innovations)*, Inge Oskam, Noordhoff Uitgevers, ISBN987-90-01-79698-3.
- Relevant website:
<http://www.ontwerpentechnischeinnovaties.noordhoff.nl/sites/7563/index.htm>

Exams and assessment

This course is assessed through inclusion of the following aspects in the PDs:

- Orientation (QFD)
 - Problem statement
 - Development of the client requirements into design criteria through QFD
- Analysis
 - Technology exploration
 - Functional analysis
 - Design criteria
- Detailing
 - Production method proposal
- A 3D assembly drawing of the designed bicycle in SolidWorks (digital)
- A 3D-printed scale model of the designed bicycle

3.9 Marketing

Project 'The Bike Factory' requires a basic understanding of marketing. This course focusses on two aspects of marketing: customer needs and marketing mix.

Bachelor	IE&M
Period	Y1Q3
Course name	Marketing
Hours	<ul style="list-style-type: none">• 1 x 2 hours lecture in week 1• 1 x 1 hour question hour in week 3• 1 x 2 hours workshop in week 4• 8 + 3 hours individual study (see under 'Education methods')• Total study time: about 15 hours
Attendance during lecture and workshop	MANDATORY In case of no attendance you will get an extra individual task
ECs	You need to do this course (including the workshop) as part of the project.
Teacher	Ton van Kampen
Date of issue	February 2017

Objectives

The student

- Will have a basic understanding of marketing
- Will have a basic understanding of the marketing mix consisting of:
 - Product
 - Promotion
 - Place
 - Price
 - People
 - Process
- Will have used the learned marketing theory to design a marketing mix for the new 'Bike Factory'

Required pre-knowledge

This course does not require pre-knowledge.

Course contents

- Introduction to marketing
- Buying behavior of B2C and B2B customers
- Product as part of marketing mix
- Promotion as part of marketing mix
- Place as part of marketing mix
- Price as part of marketing mix

Education methods

- Lecture (1 x 2 hours)
- Q&A (1 x 1 hour)
- Self-study to prepare for workshop (8 hours)
- Workshop (1 x 2 hours):
 - During this workshop you will work with your group on determining the needs of the new 'Bike Factory' customers, your discriminators and positioning and a suitable marketing mix
- Self-study to consolidate your knowledge (3 hours)

Book and other materials

PRESENTATION MATERIAL

- PowerPoint of presented slides
- Via N@tschool

BOOK

- Marketing, An Introduction
Twelfth edition
Gary Armstrong and Philip Kotler
Pearson
ISBN 10: 1-292-01678-7
ISBN 13: 978-1-292-01678-8

Make sure that you read chapters:

1. Marketing: Creating and Capturing Customer Value
5. Understanding Consumer and Business Buyer Behavior
7. Products, Services, and Brands: Building Customer Value
8. New Product Development and Product Life-Cycle Strategies
9. Pricing: Understanding and Capturing Customer Value
12. Engaging Consumers and Communicating Customer Value: Advertising and Public Relations (only pages 394-405)

Recommended further reading:

chapter 10 (pages 330-341), remaining part of chapter 12, chapter 13 and chapter 14

Assessment and grading

This course is part of the project. There will be no exam. Attendance of lecture and workshop is mandatory. If you don't attend the lecture and/or workshop you will get an extra individual task.

3.10 Communication

Department	IE&M
Programme phase	Year 1, 3 rd period
Curriculum component	Communication
Class contact hours	1 lecture 3x 2 hours seminar
Credits	Included in project assignment
Study load	Included in project assignment
Course author/instructor	V. Hermans and L. Norbruis
Effective date	February 2017

Objectives

The objectives include knowledge, skills and attitude. At the end of the project you will have achieved the following objectives (or attained the following skills) for this course.

Knowledge

The student knows...

- the broad principles that apply when writing advisory recommendation report
- the various options for structuring a report and the effect associated with each
- the difference between using a research model and a reporting model
- the difference between direct and vague use of language
- the guidelines that apply for reporting in IE&M as described in *Writing is leading and enticing*
- the requirements for giving a convincing presentation

Skills

The student can...

- articulate the specific contents of advisory recommendation report
- formulate a viewpoint as effective advice to the client
- thematically categorise the various components in support of the recommendations
- use an arguments ladder or arguments chart as a resource for deciding on the structure
- provide the reader with signals to indicate how the various chapters and sections in a report are interrelated through the correct use of signal words and transition sentences
- use the right skills to hold a convincing presentation

Attitude

The student...

- is willing to look critically at the formulation and structure of their own writing and, when uncertain, to consult the appropriate literature
- recognises the importance of clear formulation and good spelling
- understands that readability is paramount in all documents that must be submitted and acts accordingly (care, layout, use of language, formulating annexes, etc.)
- recognises the importance of clear and convincing presentation and advisement with regard to the assignment and the client

Prerequisite knowledge

The following is considered prerequisite knowledge:

- The subject matter from Kraaijeveld & Weusten (2014), Tiggeler (2011) and Bogers et al. (2012) taught (2012)
- The notes from the lessons in periods 1 and 2

- Feedback received following the presentation in period 2

Subject matter – selection and arrangement

The curriculum includes:

- The pyramid and funnel models for reporting
- Principles of reliability, credibility and accountability and their impact on structure, language, spelling and care
- Writing independent passages of text without grammatical or spelling errors
- Writing an introduction for a report
- Deciding on a structure for the recommendation report
- The design/layout of the report
- Basic principles for giving a convincing, industrial engineering presentation

Teaching methods

1. Lecture including self-test of prerequisite knowledge from periods 1 and 2 (including *Helder Denken (Clear thinking)*), presentation of general principles of reporting and presenting, structure of subsequent lectures and establishing the need for the lectures
2. Seminar prior to submission of the final recommendation report and the presentation, with attention given to matters of form and feedback on the PDs.

In all seminars students may be asked to work individually, depending on the exercise or the stage of the process. **If a student is not prepared or does not bring the required books (see point 5 ‘Teaching and learning resources’) he or she may be asked to leave the seminar.**

Teaching and learning resources

Kraaijenveld, K. & S. Weusten (2014). *Helder denken, de gids voor helder denken (Thinking clearly, the guide to clear thinking)* De denkacademie. pp. 28-42, 50-53 (seminar 1), pp. 40-49, 55-61 (seminar 2), pp. 62-63, pp. 76-85 (seminar 3)

Tiggeler, E. (2011). *Check je tekst, Tips en checklists om snel beter te schrijven (Check your text, Tips and checklists to quickly write better)* The Hague: Sdu Uitgevers. Chapter 9-13 (seminar 1), chapters 3-6 (seminar 2), chapters 7 and 8 (seminar 3)

Bogers, H. et al. (2015). *Schrijven is (ver)leiden, richtlijnen voor effectief rapporteren (Writing is leading and enticing)*. Eindhoven, Fontys University of Applied Sciences.

Exams and assessment

The assessment form for the recommendation report and the final presentation for project ‘The Bike Factory’ can be found in the study guide. Any improvements to final document take place in week 10.

4 Annexes

4.1 Information for the project

The following information is available regarding Sepeda NV:

Final balance sheet as of 31/12/2016

building	€	1,260,000	equity capital	€	600,000
assembly lines	€	60,000			
transport equipment	€	285,000	mortgage loan	€	882,000
inventory	€	360,000	long-term loan	€	2,200,000
stock of frames	€	531,000	accounts payable	€	2,068,977
stock of parts sets	€	537,000	bank credit	€	629,023
stock of packaging mat.	€	2,000			
stock of bicycles	€	1,320,625			
accounts receivable	€	2,024,375			
liquid assets	€	0			
	€	<u>6,380,000</u>		€	<u>6,380,000</u>

Note:

- The fixed assets are valued at purchase price minus depreciation.
- The stock of frames is valued at a purchase price of €88.50.
- The stock of parts sets is valued at a purchase price of €89.50.
- The packaging material is valued at purchase price and amounts to €1 per bicycle.
- The stock of bicycles is valued at the integral manufacturing cost price.
- 50% of the accounts receivable can be characterised as dubious.
- The corporate tax rate is 20%.
- Half way through the year €31,500 of the mortgage must be repaid and €175,000 of the long-term loan.
- The interest on the mortgage loan is 6%, on the long-term loan 5% and on the bank credit 4%.
- The accounts payable are suppliers of frames, parts sets and packaging materials.
- Sepeda's selling price to the bicycle dealers, both for the ladies' and men's bicycles, is €302.50 each, excl. VAT.
- There are 5,000 bicycles in stock.
- The building has 5,400 m² of floor space.
- The integral manufacturing cost is €264.13.
- The commercial cost price is €274.10.

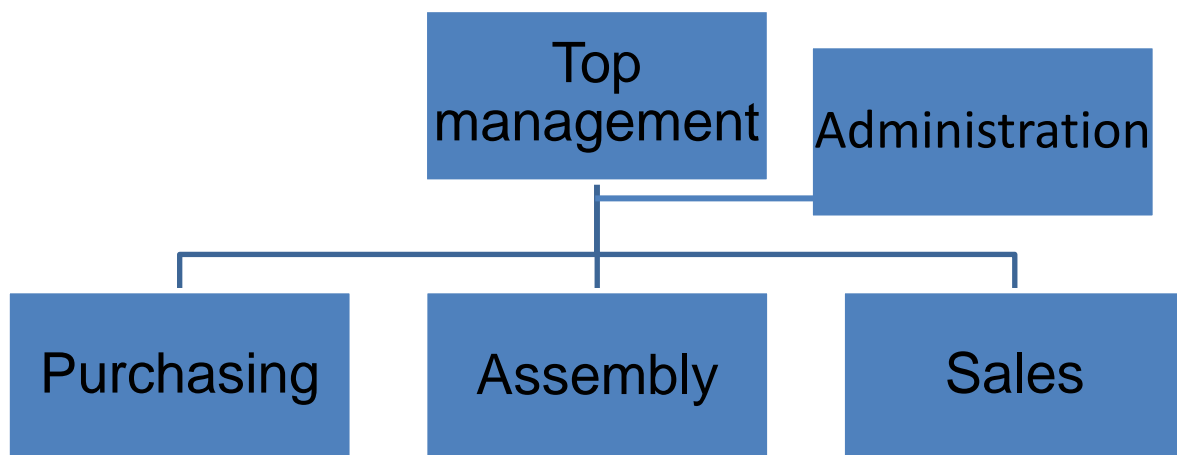
The (nearly) bankrupt company is organisationally divided into a number of departments, namely:

- Top management (1 director)
- Administration (2 accounting staff)
- Purchasing (2 buyers)
- Assembly (150 production workers)
- Sales (4 salespeople)

Sepeda has always purchased the frames and then assembled the bikes. Frames and parts sets were purchased. In the assembly department the bikes were made from one frame and one parts kit.

The purchasing department handled the purchasing of frames and parts. The sales department canvassed for customers and handled distribution of the ordered bicycles. The administration department is a support department.

Sepeda always based its operations on a normal production and the sale of 50,000 ladies' bikes and 50,000 men's bikes. At this level, a market share of 8% of the Dutch bicycle market could be achieved. Unfortunately this was no longer achieved during the last two years.



4.2 ProjectBox and SubmitBox

ProjectBox submission of PDs!

Project 3 is supported by ProjectBox, an interactive Fontys software application, accessible via <http://intern.fontys.nl/projectbox>. Students must submit all assignments relating to the project here. Feedback to the group is also provided via this medium.

ProjectBox contributes to these goals by providing students and mentors a single place in the cloud where all blank/completed forms and all scheduled dates/events can be found. The forms are filled in directly on the screen (thus eliminating the paper chase). In addition, all project participants, depending on their roles, are reminded to perform the necessary activity at the right moment.

All project participants are requested to report problems and suggest ideas for further improvement to t.vankampen@fontys.nl.

The following rules apply for submission of all progress documents:

- Use a correct file name for you assignment: <Course><Task><student number/groups number>
- Use PDF (Acrobat) format for submissions.
- Select the correct period. For this project it is Period 3.
- Select the correct task/assignment.
- Select **all** the teachers who will have to review the assignment.
- Also link your group members and mentor.

SubmitBox submission of tasks!

All tasks for this project will be submitted via SubmitBox, an electronic central mailbox. Submission applies only to individual and group tasks.

You can access SubmitBox with the following link : <http://portal.fontys.nl/bent/submitbox/default.aspx>
This site also contains a manual and a video explaining how to use SubmitBox.

Please keep the following points in mind so the assessment via SubmitBox can be completed as efficiently as possible:

- Use a correct file name for you assignment: <Course><Task><student number/group number>
- Use PDF (Acrobat) format for submissions.
- Select the correct period. For this project it is Period 3.
- Select the correct task/assignment.
- Select **all** the instructors who will have to review the assignment.
- Also link your group members and mentor.

4.3 Rubric - Final grading form

Form	Aspect	Indication	Score <4	Score 4 - 6	Score 6 - 8	Score >8
Recommendation report	Structure	Is capable of employing the Essence-Elaboration-Conclusion (EEC) principle at the section and paragraph level.	Use of EEC principle at section and paragraph level is missing.	The EEC principle has scarcely been used at section and paragraph level.	The EEC principle has regularly been used at section and paragraph level.	The EEC principle has been consistently and correctly used at section and paragraph level.
	Substantiation	Is capable of correctly and concretely explaining various choices (target group choice, CSR strategy, technical specifications, marketing mix, etc.) in the final document.	Substantiation of choices is missing.	Scarcely able to support the various choices correctly and concretely.	Reasonably able to support the various choices correctly and concretely.	Fully able to support the various choices correctly and concretely.
	Recommendations	Is capable of providing convincing and feasible recommendations.	Recommendations are missing.	Recommendations scarcely convincing and feasible.	Recommendations reasonably convincing and feasible.	Recommendations are convincing and feasible.
	Layout and language use	Is able to create a professional layout and demonstrates professional proficiency in the use language.	Does not meet the requirements.	Poor layout The language use is problematic in numerous places.	Acceptable layout. Few problems with language use.	Professional layout Language use is at a professional level.
Presentation	Recommendations	Is capable of presenting recommendations convincingly and within the time limit.	Unconvincing and not within the time limit.	Hardly convincing but within the time limit.	Fairly convincing and within the time limit.	Very convincing and within the time limit.
	Structure and coherence	Is capable of conveying the structure and coherence between the various elements (target group choice, CSR strategy, technical specifications, marketing mix, etc.).	Explanation of the structure and coherence between the various elements is missing.	Poor explanation of the structure and coherence between the various elements.	Reasonable explanation of the structure and coherence between the various elements.	Good, convincing explanation of the structure and coherence between the various elements.
Defence	Insight	Is capable of explaining the coherence between the various elements in a new scenario (what if...).	Not capable of explaining the coherence between the elements in a new scenario.	Somewhat capable of explaining the coherence between the various elements in a new scenario.	Reasonably capable of explaining the coherence between the various elements in a new scenario.	Fully capable of explaining the coherence between the various elements in a new scenario. Demonstrates creativity.

4.4 Exams and assignments

Code	Title	EC (%)	EC
481B3FIE	The Bike Factory	5.0	5
481B3IND	Period 3 exams	6.0	
481B3BEZ	Company visit 3	8%	0.5
481B3MVO	CSR 3	25%	1.5
481B3BE	Business Economics 3	33%	2
481B3WIS	Mathematics/statistics 3	33%	2
481B3TAAK	Period 3 assignments	4.0	
481B3NAT	Physics 3	25%	1
481B3OND	Research Skills	25%	1
481B3MO	M&O 3	25%	1
481B3ENG	English 3	13%	0.5
481B3COM	Competence document 3	13%	0.5

4.5 Some additional search tips for IE&M students

On the Mediatheek pages (via Fontys portal) you have access to the **biep.nu** search engine. Other useful websites for searching are of course the Google website and – for more ambitious searches, the Google Scholar website. Some suggested searches are (with use of citation marks for precise results):

- “product innovation”
- “product lifecycle” / “product lifecycle management”
- “innovation process”
- “innovation funnel”
- “iterative design” / “iterative design process”
- “design review session”
- “design specification”
- “requirements analysis” / “requirements specification”
- QFD / QFD requirements analysis
- Team design / design teams
- Orientation phase in product design
- 5W2H method (asking what, why, where, when, who, how, and how much)
- “eco design”
- “kano model” / “voice of the customer”
- Project planning / design projects
- “Gantt chart” for project planning
- Group dynamics
- Timothy Leary / Leary's Rose

According to Leary's Rose behaviour calls up behaviour: action and reaction, cause and effect, send and receive. Fifty years later Leary's Rose is still a simple and effective model used to study human interaction (action-reaction).

Related models: Big Five; Core Quadrants van Ofman; Whole Brain Model van Herrmann; Color Theory of Change; Cultural Dimensions (Hofstede); Leary's Rose; Six Thinking Hats (De Bono); Social Styles (Wilson); Belbin

(source: http://www.models2use.com/all/management-models-rose-leary.html?store=us&from_store=nl)

- Team development model by Tuckman

Most searches give references to useful books, but also to articles with full text available when you are logged in as a Fontys student). There are quite a few useful links to the Journal of Product Innovation Management published by the Product Development and Management Association (<http://www.pdma.org/>).

Another interesting website to check out is <http://creatingminds.org/> which lists several tools for defining problems, creating and selecting ideas, and other useful information on creativity and innovation.

4.6 Mutual assessment form for IE&M project

Group number:

Student's name:.....

Give your group members **and yourself** a rating for each of the evaluation criteria by circling a number (1 is lowest, 5 is best).

All members of the group must list the group members' names in the same order in this list!!!

Name	Contribution to the content	Effort	Collaboration
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Group mentor (To be completed by group mentor)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5