

Technical University of Denmark



## UDTU Assignment 4A

Howard, Thomas J.

*Publication date:*  
2011

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Howard, T. J. (2011). UDTU Assignment 4A.

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# UDTU Assignment 4A

---

*Thomas Howard*

## **A Short Introduction to the Course**

### **Commentary on course description**

The official course description can be found in appendix 1 of this document. Alternatively see:

<http://www.kurser.dtu.dk/27690.aspx?menulanguage=en-gb>

The purpose of the course is to teach pharmacy students some project management skills. This will help them to manage research projects at a postgraduate level, but it is mainly aimed at helping the students develop successful solutions in commercial projects.

The course will not only give an introduction to project management techniques, methods, tools and process but it will also help the students appreciate their research/development projects in the context that that such a project may be conducted in industry.

### **Course Pre-Requisites**

There are no prerequisites for this course.

## **Formulation of Learning Objectives and Analysis of Course Subject**

This section outlines how the learning objectives for the course were chosen and formulated using guidance from Blooms taxonomy.

### **Levels of understanding to be attained**

The course is an introductory course to project management. It is therefore important that the students gain some high level understanding of what project management is and how some of the approaches may be applied to instances of product development. It is then hoped that the student will be able to learn from how project management approaches are applied in a product development context and will then be able to apply them to the management of pharmaceutical product development projects.

In this section each level of Bloom's taxonomy will be related to the course under development saying if and how it is related:

### **Knowledge**

This can be tested to a degree but is probably less useful and important for the students of this course. Some of the things that the students may wish to have 'knowledge' of:

- Typical stages of a generic project process model
- Definitions of stage gates
- Definitions of the types of organisational structures

- List portfolio management approaches

### **Comprehension**

This is the level at which I hope to focus on during my teaching of this course. I feel it most important that the students are able to understand the principle behind the content I am delivering so that they can hope to apply it to their own context in the future. I hope that the students will be able to:

- explain why integrated product development is and why it's important
- understand the multitude of actors affected by design decisions
- Ability to read and interpret process models
- To be able to interpret bubble diagrams and other portfolio planning methods

### **Application**

It is important that the student are able to apply the theoretical work to their own context. In the following semester that is exactly what would be expected of them. In this introduction I would hope that the students are able to apply some of the approaches to in some simple exercises created for them.:

- explain why integrated product development is and why it's important

### **Analysis**

This is perhaps beyond the scope of this introductory course. Also the course topic is product and project development which is more synthesis orientated in its nature.

### **Synthesis**

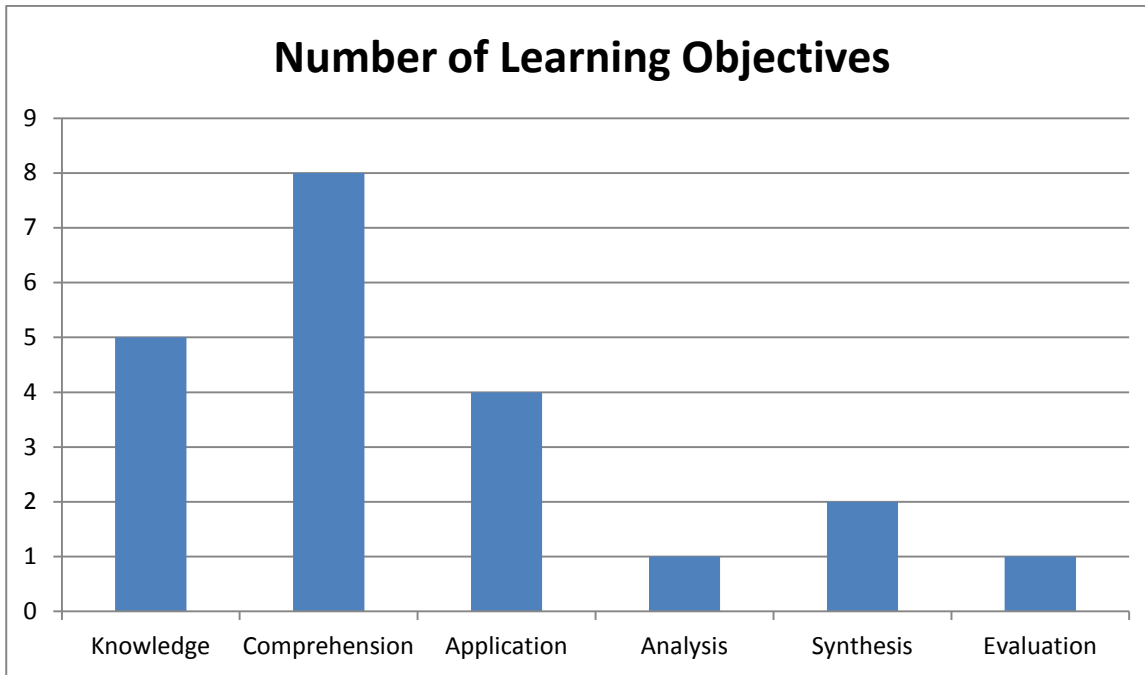
In some respects this is the most important of the learning objectives for this course and is feasible for a certain aspects of the course but not all. The main output of the course is to create a process model suitable for their project work. If they are unable to synthesis this model then the rest of the the learning objectives obtained have far less utility.

### **Evaluation**

Perhaps could have had more focus in selecting and re-using pre-existing models based on the current situation. Some of the comprehension objectives could have also been listed as evaluations in terms of describing the differences between the models provided.

### **Breakdown of Learning Objectives used**

Each of the section of this course had multiple learning objectives (See Appendix 2). It was important that these objectives were in line with the overall target on the Blooms Taxonomy (see above). This meant having focus on comprehension and application. The learning objectives were plotted on the following chart based on the action words of the objectives. The focus aligned with my target on the blooms taxonomy, but with a few extra on the knowledge objective which were required to enable the comprehension objectives.



### Engineering Competencies and Skills to develop

The skills to be gained are more from the management discipline than engineering discipline. However, these skills will hope to make but use of the engineering skills in the context of real world projects. The course hope to illuminate the business, organisational and environmental constraints and requirement imposed by real-world project management. The particular engineering skills used involve finding compromise and opportunities within the solutions taking into account supply chain and project consideration. For the participants of this course it will combine their in-depth knowledge of pharmacology with user considerations, clinical trial considerations, and the portfolio (how many products the company has and in which areas) and product platform (how much of previous products and technologies we wish to re-use) considerations of the company they will be working with.

### Core Elements

This course contains 6 core elements described below. Please reference Appendix 2 to see how each of these relates to the learning objectives.

1. Considering a research output as a product
2. Identifying the type of organisation in which you are conducting your project
3. Positioning your project within a company's portfolio
4. Applying innovation management principles
5. Applying project management techniques to development of new products
6. Describing the difference between Sequential and Integrated Product Development (IPD)

## **What causes the students most difficulty**

Hard to say as it's a new course. I expect that the student will have most difficulty in making the content relatable to their own situation. Putting their technical expertise of pharmacology into a business context will be a challenge but is also the purpose of the course. From meeting with course members (and teachers) it appears that there is a terminology boundary which may prevent them from understanding the management concepts.

## **The challenges to the teacher in this course**

Similar to above, overcoming the terminology boundary. Relating product development concepts to pharmaceutical design and issues. Giving the student that have not worked in industry an appreciation of what it is like and helping them relate the project management concepts to it.

## **Analysis of the Course**

### **Discussion of the ideas behind the course**

This course is meant as a stepping stone between having a good understanding of pharmacological principles and theory, to conducting and running a real world pharmacology project in industry. The course therefore has to give the students the grounding to begin and manage a project.

### **Teaching and assessment methods**

The teaching methods used numerous case studies to build up an understanding of what project management is like. There were also key tools and approaches introduced so that the students will be able to apply them directly to the following semester once they undertake their project, but also in the current semester when producing a project plan for their forthcoming projects.

The teaching method used was predominantly dialogue based with an inductive approach. This was chosen as a dialogue based method would help me gauge the levels of comprehension of the students. The inductive learning was used as a method to transfer knowledge from my domain of engineering management to pharmaceutical engineering. By starting with simple principles and examples it was hoped that the students would be able to build up a picture of how this relates and can be applied to their discipline.

The assessment method decided upon was a report and then oral exam. Although this was quite conservative, I feel that this is the most appropriate as the report would allow them to demonstrate their learning through writing a full project plan, which was the main output of this course. This was of benefit for 2 reasons, firstly it allowed the students to pick and use the methods most suitable and to apply them in the report, but also that the report would be used for the following semester and would therefore have continued reflection on the material, how well they put the report together and would illuminate the limitations and pitfalls of their planning. It was felt that the oral exam was necessary as it is one of the best approaches to gauging student comprehension, which was of prime focus from Bloom's taxonomy.

## **Evaluation of teaching material**

The material will probably need modernising soon and will need to bring in more case studies from the pharmaceutical industry. The material was good but could have been adapted to keep the student more active.

## **What, if possible, I would have planned differently**

I would like to have mixed dialogue based learning and exercises and application up a bit more. I was very concerned that the students would relate to the ideas but perhaps this could have been dealt with by using a few simple but well constructed exercises using pharmacy examples. This would have also made the student more active and alert.

A full pre-test would have been conducted.

## **Pre-testing of students**

Due to the time and access limitations the pre-test was conducted by asking another lecturer from the pharmacy department. This was a mistake and I should have pushed harder to gain access to the students beforehand. In hindsight a pretest (discussion) would have asked the following questions:

1. In your area of research what would you consider to be a product?
2. What do you consider the output of your research to be?
3. What is the Pharm-Product development process?
4. What role do you see yourself fulfilling in your project work?
  - Scientist?
  - Engineer?
  - Drug developer?
  - Project Manager?

Knowledge of their final projects and the associated companies would also have greatly helped.

## **Impressions of the first part of the teaching sequence**

The course did not really begin as expected due to the fact that an adequate pre-test had not been conducted. The first part of the session was therefore conducted using the dialogue style teaching method helping to gauge and relieve the blank expressions.

# Course Plan

---

## Introduction to product development

- What does a product mean to you and what does it mean to me?
- What is an innovation?
- What is a good product?

## Organisational Structures

- Functional organisations
- Project based organisations

## Product Planning

- Types of new products development projects
- Portfolio management
- Financial method
- Bubble diagrams
- Platforms

## Managing the Innovation Process

- NPD philosophies
- Tools to speed up the front end of innovation
- 5 steps project management

## Product Development Process

- Generic Development Process Models
- Stage gate model
- Scrum model

## Integrated Product Development

- Generic Development Process Models
- DfX methods
- Downstream affects

## Appendix 1 – The official DTU course Description

### 27690 Module 1: Introduction to Project Management

General Competence course, Pharmaceutical Design and Engineering

**Danish title:** Module 1: Introduktion til projektledelse i medicinalindustrien

**Language:** English

**Point (ECTS )** 5

**Course type:** BSc/MSc- Advanced Course  
General competence course, Pharmaceutical Design and Engineering

---

June  
From June 11

#### Schedule:

**Scope and form:** Lectures, group work

**Duration of Course:** 3 weeks  
Decide with teacher

#### Date of examination:

**Type of assessment:** Oral examination  
Individual, oral examination based on report

**Aid:** No Aid:

**Evaluation:** Except PowerPoint slides of report  
7 step scale, internal examiner

#### **General course objectives:**

The aim of the course is to introduce the participants to project management and provide them with the necessary tools and framework for the initiation of the integrated second year course.



## Learning objectives:

A student who has met the objectives of the course will be able to:

- Demonstrate ability to systematically search, retrieve and critically assess relevant scientific, patent and market literature from the World Wide Web.
- Understand how to set timelines and define milestones, work packages and deliverables.
- Plan and perform task delegation, communication and following up among group members.
- Present, explain, discuss and defend project ideas orally and in writing to group members and to decision makers (board members, advisory board members etc.).
- Master the assessment of group members' inputs in the overall context of the project.
- Apply methods for putting scientific project proposals into writing.
- Explain the composition and execution of a typical real-life project in the pharmaceutical industry.
- Understand and explain specific formal and practical requirements for pharma-related scientific projects.

## Content:

The students will work in groups of 2 to 5 persons. Groups are formed with members of diverse competences; taking into consideration that course participants are students with various bachelor degrees. At the start of the course, students will be presented with a number of real-life problems from industrial partners, from which they will choose one to address during the integrated project of the second year. The students will discuss and create a report on how they will approach and delimit the chosen project, preferably in the form of a research proposal plan (e.g. for external funding). Students will also be introduced to various project management tools and concepts, such as SWOT analysis, Gantt chart, work package, milestones and deliverables, aiming at strengthening their collaborative abilities and creating a solid plan for the integrated project.

## Remarks:

This course constitutes the first module of the integrated second year course in Pharmaceutical Design and Engineering.

## Responsible:

[Irene Kouskoumvekaki](mailto:irene@cb.s.dtu.dk), 208, 16, (+45) 4525 6162      (+45) 4525 6162 ,  
[irene@cb.s.dtu.dk](mailto:irene@cb.s.dtu.dk)

**Department:** 27 Department of Systems Biology

**Registration Sign** At CampusNet

**up:**

**Keywords:** Project management, milestones, communication, group work, scientific writing, pharma industry

## Appendix 2 – Core Elements and Learning objective breakdown

This course contains 6 core elements (numbered below) each containing a further 4 learning objectives:

### 1. Considering a research output as a product

- A. Explain what is meant by a product and its dependence on context.
- B. Explain where product design sits in the product development process.
- C. Explain where development decisions and activities may take effect.
- D. Formulate your product development success criteria and challenges

### 2. Identifying the type of organisation in which you are conducting your project

- E. Explain the difference between organisational structure types.
- F. Explain the benefits and problems of the different types of organisational structure.
- G. List the ways in which an organisational may be structured or change.
- H. Identify organisational structures and consider the important aspects.

### 3. Positioning your project within a company's portfolio

- I. Define the different types of new product developments in relative terms.
- J. List the 5 stages of the product planning process.
- K. Explain what is meant by a product platform.
- L. Apply portfolio management techniques.

### 4. Applying innovation management principles

- M. Evaluate the scope of activities related to innovation management.
- N. Follow the four stage innovation management model.
- O. List the leadership roles associated with your project work
- P. Identify important business criteria, trade-offs and innovation measures.

### 5. Applying project management techniques to development of new products

- Q. List the benefits of a formalised product development process.
- R. Explain what is meant by a stage-gate process.
- S. Determine which development process models are most suitable.
- T. Formulate a complete process model for your project.

**6. Describing the difference between Sequential and Integrated Product Development (IPD)**

U. Describe the difference between Sequential and Integrated Product Development (IPD)

V. Name the 3 key disciplines in IPD

W. Analyse a simple product in terms of the three main disciplines of IPD

X. Identify the important stakeholders involved in the development of a product