

# Technology forecasting and S-curves (EM165M37)

Program	PGE
Module / ECTS / Path / Specialisation	<b>Module :Technology forecasting and S-curves : 5 ECTS.</b> <ul style="list-style-type: none"><li>• Visitants</li></ul>
Discipline	Strategy
Year	2019
Semester	A
Open for visitors	no
Available places	30

## Coordinator

Dimitry KUCHARAVY

## Lecturers

Instructor	Population	Email
Dimitry KUCHARAVY	Population	dzmitry.kucharavy@em-strasbourg.eu

## Course format

Working language :	English
Volume of contact hours :	27 h
Workload to be expected by the student :	108 h

## Course track

Track : Attendance

### "Attendance" track :

Attendance at lecture / tutorial classes and intermediate / final exams is mandatory. As evaluation of in class work constitutes an essential element of grading, any absence will be penalized and is taken into account for grading purposes (see academic rules and regulations).

### "Autonomous" track :

Attendance at intermediate / final exams is mandatory, but students are free to attend lecture / tutorial classes.

For all Master programs and all other programs realized in the form of dual internships (apprentissage), attendance at lecture / tutorial classes and intermediate / final exams is entirely mandatory. Therefore, only the "Attendance" track can be selected.

# Contribution of the course to the educational objectives of the programme

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How the course contributes to the programme :

## Description

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The aim of the course is to provide information and knowledge on the modern methods for technology forecasting and prediction of socio-technological changes. It is supposed to proceed with the definition of the main features of technology forecast and forecasting process. Therefore, we will proceed with a discussion of some problems of forecasting. The course will show some possible integrations with inventive problem solving, innovative design and strategic planning activities.

A particular technique "Extrapolation with S-curves" will be introduced for supporting practical studies about future. Practical work-shops will be proposed for individual and group exercises, with and without the use of dedicated software.

## Educational organisation

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In class

**Lectures**

**Presentations**

**Tutorials**

In groups

**Exercises**

**Projects**

**Case studies/texts**

Interaction

**Discussions / debates**

**Workshops**

Assignments

**Individual projects (online assignments, video,)**

**Specific projects / case studies**

**Readings**

## Learning outcomes

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

- **Recall** and recognize modern methods for technology forecasting
- **Apply** learned models for defining the system scope (system to forecast)
- **Employ** methodology of fitting time-series data with logistic S-curve model
- **Construct** an interpretation of results useful for strategic decision-making

## Outline

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## Introduction

- why do we need to forecast socio-technological changes,
- alternatives to a forecast,
- product evolution cycle,
- scope of technology forecast,
- strategic planning and forecast,
- why it is tough to forecast.

## Methods of technology forecasting

- history of methods,
- types of forecasts,
- classifying the forecasting methods,
- combination of methods.

## The use of forecasting methods in practice

- what is technology, technology and the environment,
- roadmaps of technology changes,
- application, advantages and limitations.

## Extrapolation with S-curves and study about future

- basic concepts,
- main characteristics of the technique,
- application of S-curves for studying about future,
- case example: fifty years prediction for energy technologies.

## Project work

- choosing the topic
- developing study: step by step instructions
- final presentation of developed results

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## Prerequisites

**Key concepts to understand :**

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## Teaching material

### Documents in all formats

- Syllabus
- Worksheets
- Guide
- Case studies

### Software

- MS EXCEL
- MS POWERPOINT
- Statistical software
- Dropbox/GoogleDrive/SkyDrive

### Additional electronic platforms

- Slideshows
- Videos
- Other

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## Recommended reading

### Major works :

1. T. Modis, Natural Laws in the Service of the Decision Maker: How to Use Science-Based Methodologies to See More Clearly further into the Future. Growth Dynamics, 2013. <http://www.growth-dynamics.com/default.asp?page=books>
2. Meyer, P.S., Yung, J.W. and Ausubel, J.H. (1999) A Primer on Logistic Growth and Substitution: The Mathematics of the Loglet Lab Software. Technological Forecasting and Social Change, 61(3), 247-271.
3. IIASA – Logistic Substitution Model II: <http://webarchive.iiasa.ac.at/Research/TNT/WEB/Software/LSM2/ls2->

**Further reading :**

1. Grübler, A., 2003. Technology and Global Change, Cambridge: International Institute of Applied System Analysis.
2. 2012: D. Kucharavy, R. De Guio, Application of Logistic Growth Curve. In C. V. Machado & H. V. Navas, eds. TRIZ Future Conference 2012. Lisbon, Portugal: Universidade Nova de Lisboa, Portugal, pp. 41–53. <http://www.seecore.org/d/20121024rf.pdf>
3. 2007: Kucharavy, D. and R. De Guio, Application of S-Shaped Curves, in 7th ETRIA TRIZ Future Conference 2007. Kassel University Press GmbH, Kassel: Frankfurt, Germany. [http://www.seecore.org/d/2007\\_02p.pdf](http://www.seecore.org/d/2007_02p.pdf)

**Research works by EM Strasbourg :**

## Assessment

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**Intermediate evaluation / continuous assessment 1 :**

oral / individual / English / weighting : 20%

additional information : Attendance and active participation in class

**Intermediate evaluation / continuous assessment 2 : last session**

written + oral (20 min) / in group / English / weighting : 40%

additional information : a project, developed by students divided into groups of 2-4 students and chosen in agreement with the lecturer (preferably based on a real-world topic).

**Intermediate evaluation / continuous assessment 3 : last session**

oral (5 min) / individual / English / weighting : 40%

additional information : The individual test is a question-answers within presentation of project, requiring the knowledge about models and techniques introduced during the course.

## Grounds for expulsion from classes

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Such behaviors as...

**arriving late, leaving early or unannounced leaving of the classroom during class time**

**disruptive eating or drinking in class**

**using smartphones and laptops for non class-related purposes**

**reading non class-related documents**

**chatting on non class-related issues**

**showing disrespect towards lecturers**

... may lead to expulsion from classes.