

## Faculty of Economic, Social and Political Sciences



## INGE1312 Production and Operations Research

[60h] 6 credits

This course is not taught in 2005-2006

Language: French

Level: First cycle

**Aims**

This course provides a general introduction to production and operational management, one of the primary functions of business management.

The course objectives are (1) to familiarise students with the problems and fundamental issues facing production managers, (2) to describe and analyse the language, the concepts usually used in resolving these issues with a view to gaining a competitive advantage through operational management, (3) to study the tools and steps involved in the quantitative management methods used to model and tackle these problems.

A process vision of operations is adopted to capture and analyse the fundamental dimensions of operations management, such as capacity management, cycle time management, logistics and quality management. These processes are conceived as basic technologies that all organisations use to produce and distribute goods and services able to meet consumers' expectations.

To study the problems of operational management effectively, the course is divided into three parts or steps. First, students must learn how to model and understand production processes and the product and information flows associated with them.

Part 2 examines the causal relations between the structure of the processes and their performances. Lastly, a systematic analysis of management levers and their impact on process performance identifies implications for managerial action.

This modelling approach focused on the analysis of managerial action in operations management is strengthened by a systematic study of the principal quantitative management methods underpinning such an approach.

This product-oriented course serves as an introduction to the specialist option in "Problems and Methods in Production and Operations Management". In addition to the advanced courses offered within this option, there is another optional course intended for other specialist options which deals with operations management within the service sector.

## Main themes

Operations Management  
 Description, analysis and strategic management of production processes.  
 Products, processes and performance  
 Management strategies, product-process matrix  
 Measure of production flow  
 Performance measures: output rate, cycle time, stock  
 Process modelling and cycle time analysis  
 Production rate modelling and capacity analysis  
 Stock level modelling and management  
 Action levers: cycle time, output rates and stock levels  
 Management of uncertainty and variability in production flow  
 Service rate and strategic stock  
 Service periods and capacity reserves  
 Control and mastery of processes, process capability  
 Integration  
 Improvement of flow on a site: design, flexibility, variability  
 Improvement of flow in the logistical chain: synchronisation  
 Continuous improvement process  
 Methodological tools  
 Linear programming  
 Modelling and optimisation: case studies  
 Duality and sensitivity analysis  
 Integer Programming  
 integer modelling: case studies  
 branch and bound algorithms  
 Resolution complexity and heuristics  
 Stock Management  
 Deterministic and stochastic models  
 Demand Forecasting  
 Time series and extrapolation methods  
 Causal regression and methods  
 Introduction to simulation and queuing  
 Simulation studies  
 Statistical analysis and interpretation of results  
 Role of queue models  
 Introduction to decision analysis and game theory  
 Decision trees  
 Decision-making in uncertainty  
 Game theory

## Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Evaluation: The evaluation is the result of a continuous evaluation of students' class activities during the term. A final examination can take place at the end of the course and consists of solving management cases (reference to course notes permitted).