UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematical Models for Hospitality and Tourism Management

2526-1-F7602M008

Learning objectives

Knowledge and understanding: the aim of the course is to provide students with a foundational knowledge of mathematical tools in order to independently develop quantitative analyses of the models used in revenue management applied to the tourism economy.
Applying knowledge and understanding: the course aims to develop the ability to apply revenue management models to the tourism economy through the analysis of illustrative practical situations and simple case studies.
Making judgements: the objective of the course is to foster independent judgement by presenting real-world problems and illustrating the process of mathematical formalization and analysis of the resulting models.
Communication skills: the goal is to equip students with the tools to develop appropriate technical language related to mathematical models for the tourism economy.
Learning skills: through the tools presented during the course, students will be encouraged to refine their ability to interpret problems related to the tourism economy and to choose the most appropriate methods to address them.

Contents

Mathematical models developed for tourism management and focusing in particular on applications in airlines and hospitality industry.

Detailed program

The course will begin with an overview of the objectives and key elements that define Revenue Management. In particular, the main components of the Revenue Management process will be introduced, including the strategic, tactical, and control levels, as well as concepts such as market segmentation and willingness to pay, demand curves and price elasticity, revenue function maximization, product differentiation and diversification, and revenue

maximization under capacity constraints.

Subsequent topics will explore the control and tactical levels in greater depth, focusing on:

- Booking control, through allottment or nesting
- Capacity allocation for single-resource products: Littlewood’s rule; Belobaba’s Expected Marginal Seat Revenue models (EMSRa and EMSRb); cases of imperfect market segmentation
- Network Revenue Management: multi-resource products, heuristics, linear programming, virtual nesting, and network bid pricing

Additional topics may be covered upon students' request, such as price-based optimization, overbooking, consumer choice modeling, and market dynamics.

Prerequisites

In this course the knowledge of basic concepts of mathematical analysis and probability are requested.

Teaching methods

In-person classes, with up to 12 hours of remote teaching, depending on students' specific needs.
All 40 hours of teaching are delivered in a dispensing format.

Assessment methods

The exam can consist both of questions about theory and exercises, with a possible oral exam on request. The former test students’ knowledge and understanding of the main concepts of the subject. The latter measure students’ ability in the application of such concepts to solve simple practical problems.
An intermediate partial exam is planned.
The carrying out of a project that integrates the evaluation is optional and upon request of the students.

Textbooks and Reading Materials

Slides and teaching material at disposal on the couse site

Textbooks

- Talluri, K.T. and Van Ryzin, G.J. “The Theory and Practice of Revenue Management” Springer, 2005.

- Phillips, R.L. “Pricing and Revenue Optimization” Stanford University Press, 2011.

Semester

Second semester

Teaching language

Italian

Sustainable Development Goals