

International Master in

HEALTH ECONOMICS AND PHARMACOECONOMICS

Study Guide

February 2021

Table of contents

| | |
|---|----|
| Welcome from the directors..... | 3 |
| Faculty | 4 |
| The program and the qualifications awarded..... | 6 |
| Brush-up courses..... | 7 |
| Academic Calendar | 8 |
| Content by Courses..... | 10 |
| Study method..... | 27 |
| Assessment criteria | 30 |

Welcome from the directors

Dear participant,

Welcome to the International Master's degree in Health Economics and Pharmacoeconomics. The aim of this program is to provide specialized training in economics and management of both health care services and pharmaceuticals (pharmacoeconomics).

In this study guide you will find all the relevant information of your program. We strongly recommend you read this guide thoroughly in order to benefit the most from this learning experience.

From now on, the team of academic directors, professors, and support staff working in the e-learning programs at UPF Barcelona School of Management, are going to be here to help you in the learning process you are about to start.

We encourage you to undertake this challenge with strength and motivation.

Academic directors

Jaume Puig-Junoy



Carlos Campillo Artero



Steering Committee



Jaume Puig-Junoy

Director of the program. He has a Doctor's Degree in Economic and Business Sciences from the Autonomous University of Barcelona. Former Director of the Centre for Research in Health and Economics (CRES). He has held posts of responsibility in public health service management in Catalonia and has published numerous works of research on health economics and pharmacoeconomics in international scientific journals.

Webpage
Google scholar
ORCID

<https://jaumepuigjunoy.cat/en/home/>
<https://scholar.google.com/citations?user=UV4j3fAAAAAJ>
<https://orcid.org/0000-0003-1695-3108>



Carlos Campillo-Artero

Director of the program. Doctor in Medicine and Surgery (University of Barcelona), Master in Public Health (The Johns Hopkins University, Baltimore, MD, USA) and Specialist in preventive medicine. Associate researcher at the Research Center in Economics and Health, UPF. He works in clinical evaluation and health services in the Servei de Salut, Illes Balears (Mallorca). Ex-officio and current consultant of the WHO, member of the Technical and Institutional Committee on Patient Safety of the MSSSI.

Research Gate
ORCID

https://www.researchgate.net/profile/Carlos_Campillo-Artero
<https://orcid.org/0000-0002-7553-597X>



Carles Murillo Fort

Co-founder of the program. Professor Emeritus, Department of Experimental and Health Sciences at University Pompeu Fabra.



Oscar Navarro Campàs

Assistant director of programs in Health Economics and Pharmacoeconomics at UPF Barcelona School of Management. Degree in Economics (Universitat Pompeu Fabra).

Professors



Jaime Pinilla Domínguez

Professor of Applied Economics, Department of Quantitative Methods in Economics and Management, University of Las Palmas de Gran Canaria.

Google scholar
ORCID

<https://scholar.google.com/citations?hl=ca&user=s8IC1HAAAAAJ&https://orcid.org/0000-0002-7126-4236>



Lluís Segú Tolsa

Managing partner at Oblikue Consulting S.L. Degree in Pharmacy, Professor at the Department of Pharmacy at the University of Barcelona.



Marisol Rodríguez Martínez

Professor of Applied Economics, Department of Economic Policy and World Economic Structure, University of Barcelona.

Google scholar

<https://scholar.google.com/citations?hl=ca&user=PATVHSkAAAAJ>



José Manuel Rodríguez Barrios

Health Economics Lead Spain at Novartis Pharmaceuticals. PhD in Epidemiology by Rey Juan Carlos University.



Carlos Crespo Palomo

Co-Owner & CEO at Axentiva Solutions. PhD in Statistics by the University of Barcelona. Professor at the Department of Statistics at the University of Barcelona.

Research Gate
ORCID

https://www.researchgate.net/profile/Carlos_Crespo
<https://orcid.org/0000-0001-6066-0818>

The program and the qualifications awarded

MASTER'S DEGREE IN HEALTH ECONOMICS AND PHARMACOECONOMICS

The successful completion of Courses 1 to 8 and the Term paper (Course 9) entitles the participant to the Master's Degree in Health Economics and Pharmacoeconomics.

IMPORTANT: To complete Courses 1 to 5 or 1 to 7 does NOT entitle the student to receive any Diploma, if enrolled in the Master program.

Brush-up courses

You will be given the opportunity to brush up your knowledge about some basic concepts in statistics, economics and health. To this end, the UPF Barcelona School of Management offers you 3 short courses:

1. Introduction to Economics (2 ECTS)

Author: Josep María Raya Vílchez

2. Introduction to Statistics (2 ECTS)

Author: Mercè Roca i Puigvert

3. Introduction to Global Health (2 ECTS)

Author: Andreu Segura

Some (or all) of the brush-up courses might be compulsory for those students who, according to their academic profile and previous professional experience, cannot prove sufficient knowledge in the area. Mandatory brush-up courses will be informed to each participant during the admission process to the program.

The brush-up courses will not be included in your academic records. However, if you are required to do some or all of them at admission, then you must pass them to get the final qualification of the Master.

Participants proving previous knowledge will also have access to the brush-up courses and its resources for consultation purposes. Evaluation tests will only be available to those students with a compulsory enrolment.

A test with 10 multiple-choice questions, 4 possible answers and a single correct option will assess your knowledge acquisition. A minimum grade of 5 out of 10 questions will be required to pass each brush-up course. A total of 2 attempts will be available.

Calendar of the brush-up courses:

| Brush-up courses: | <i>Beginning</i> | <i>End</i> | <i>Exercise</i> |
|--------------------------------------|-------------------------|-------------------|-------------------------|
| Introduction to Economics | 17/02/2021 | 04/05/2021 | 17/2/2021 - 4/5/2021 |
| Introduction to Statistics | | | |
| Introduction to Global Health | | | |

Academic Calendar

It is highly recommended to follow this calendar to get the most out of the program, participate in the discussion forums and interact with colleagues and professors.

| Course 1. Economic Evaluation of Pharmaceuticals and Medical Technologies (1): Basic Concepts | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 03/03/2021 | 16/03/2021 | 10/03/2021 |
| Teaching Unit 2 | 17/03/2021 | 30/03/2021 | 24/03/2021 |
| Teaching Unit 3 | 31/03/2021 | 13/04/2021 | 07/04/2021 |
| Teaching Unit 4 | 14/04/2021 | 27/04/2021 | 21/04/2021 |
| Practical activity Course 1 | | 04/05/2021 | |
| Break and Retake period of end-of-unit exercises in Course 1 | | | 28/04/2021 |
| Course 2. Quantitative Techniques Applied to Health Service Management | Beginning | End | Exercise opens |
| Teaching Unit 1 | 05/05/2021 | 18/05/2021 | 12/05/2021 |
| Teaching Unit 2 | 19/05/2021 | 01/06/2021 | 26/05/2021 |
| Teaching Unit 3 | 02/06/2021 | 15/06/2021 | 09/06/2021 |
| Teaching Unit 4 | 16/06/2021 | 29/06/2021 | 23/06/2021 |
| Practical activity Course 2 | | 13/07/2021 | |
| Break and Retake period of end-of-unit exercises in Course 2 | | | 30/06/2021 |
| Course 3. Economics and Policies of Pharmaceutical Financing | Beginning | End | Exercise opens |
| Teaching Unit 1 | 25/08/2021 | 07/09/2021 | 01/09/2021 |
| Teaching Unit 2 | 08/09/2021 | 21/09/2021 | 15/09/2021 |
| Teaching Unit 3 | 22/09/2021 | 05/10/2021 | 29/09/2021 |
| Teaching Unit 4 | 06/10/2021 | 19/10/2021 | 13/10/2021 |
| Practical activity Course 3 | | 26/10/2021 | |
| Break and Retake period of end-of-unit exercises in Course 3 | | | 20/10/2021 |
| Course 4. Economic Evaluation of Pharmaceuticals and Medical Technologies (2): Advances | Beginning | End | Exercise opens |
| Teaching Unit 1 | 27/10/2021 | 09/11/2021 | 03/11/2021 |
| Teaching Unit 2 | 10/11/2021 | 23/11/2021 | 17/11/2021 |
| Teaching Unit 3 | 24/11/2021 | 07/12/2021 | 01/12/2021 |
| Teaching Unit 4 | 08/12/2021 | 28/12/2021 | 22/12/2021 |
| Practical activity Course 4 | | 04/01/2022 | |
| Break and Retake period of end-of-unit exercises in Course 4 | | | 29/12/2021 |
| Course 5. Drug Management in Health Systems | Beginning | End | Exercise opens |
| Teaching Unit 1 | 05/01/2022 | 18/01/2022 | 12/01/2022 |
| Teaching Unit 2 | 19/01/2022 | 01/02/2022 | 26/01/2022 |
| Teaching Unit 3 | 02/02/2022 | 15/02/2022 | 09/02/2022 |
| Teaching Unit 4 | 16/02/2022 | 01/03/2022 | 23/02/2022 |
| Practical activity Course 5 | | 08/03/2022 | |
| Break and Retake period of end-of-unit exercises in Course 5 | | | 02/03/2022 |
| Term Paper begins: focus on the Term Paper Proposal | | | |

Opening and closing times in the eCampus are expressed in Continental European time GMT+1.

| Course 6. Health Economics (1) | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 23/03/2022 | 05/04/2022 | 30/03/2022 |
| Teaching Unit 2 | 06/04/2022 | 19/04/2022 | 13/04/2022 |
| Teaching Unit 3 | 20/04/2022 | 03/05/2022 | 27/04/2022 |
| Teaching Unit 4 | 04/05/2022 | 17/05/2022 | 11/05/2022 |
| Practical activity Course 6 | | 24/05/2022 | |
| Break and Retake period of end-of-unit exercises in Course 6 | | | 18/05/2022 |
| Course 7. Health Economics (2) | Beginning | End | Exercise opens |
| Teaching Unit 1 | 25/05/2022 | 07/06/2022 | 01/06/2022 |
| Teaching Unit 2 | 08/06/2022 | 21/06/2022 | 15/06/2022 |
| Teaching Unit 3 | 22/06/2022 | 05/07/2022 | 29/06/2022 |
| Teaching Unit 4 | 06/07/2022 | 19/07/2022 | 13/07/2022 |
| Practical activity Course 7 | | 26/07/2022 | |
| Break and Retake period of end-of-unit exercises in Course 7 | | | 20/07/2022 |
| 22th September 2022 Deadline to retake the End-of-Unit exercises in Courses 1, 2, 3, 4, 5, 6 and 7. | | | |
| Course 8. Modelling Techniques in the economic evaluation of pharmaceuticals and healthcare technologies | Beginning | End | Exercise opens |
| Teaching Unit 1 | 31/08/2022 | 13/09/2022 | 07/09/2022 |
| Teaching Unit 2 | 14/09/2022 | 27/09/2022 | 21/09/2022 |
| Teaching Unit 3 | 28/09/2022 | 11/10/2022 | 05/10/2022 |
| Teaching Unit 4 | 12/10/2022 | 25/10/2022 | 19/10/2022 |
| Teaching Unit 5 | 26/10/2022 | 08/11/2022 | 02/11/2022 |
| Practical activity Course 8 | | 22/11/2022 | |
| Break and Retake period of end-of-unit exercises in Course 8 | | | 09/11/2022 |
| 6th January 2023 Deadline to retake the End-of-Unit exercises in Course 8. | | | |
| Term Paper | Beginning | End | |
| Getting familiar with the Term Paper Guide | 09/02/2022 | 08/03/2022 | |
| Topic Proposal | 09/03/2022 | 22/03/2022 | |
| Proposal acceptance | 23/03/2022 | 29/03/2022 | |
| Assignment of tutor | 30/03/2022 | 12/04/2022 | |
| Consultation period | 13/04/2022 | 29/11/2022 | |
| Evaluation period | 30/11/2022 | 13/12/2022 | |
| Term Paper grades | 14/12/2022 | 20/12/2022 | |

Opening and closing times in the eCampus are expressed in Continental European time GMT+1.

COURSE 1

Economic Evaluation of Pharmaceuticals and Medical Technologies (1): Basic Concepts

Author: Jaume Puig-Junoy

Professor: Jaume Puig-Junoy

General aim:

The general aim of this Course is to introduce the participant to the basic and fundamental aspects of the main techniques and instruments used in the economic evaluation of pharmaceuticals and medical technologies and apply them to several case studies. This is the first of two Courses that pursue this objective.

Specific objectives:

- To justify the need to perform economic evaluations of pharmaceuticals and medical technologies in a context of scarce resources and to convey the basic knowledge of the main methods used (cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis) and the stages or steps to follow in conducting and designing economic evaluation studies of drugs, medical technologies and health programs.
- To develop the ability to use the necessary instruments to carry out a monetary valuation of the resources used (costs) in the application of a medical technology, a drug or a health program.
- To develop the ability to use the necessary instruments to carry out a cost-utility type economic evaluation of a medical technology, a drug or a health program.
- To develop the ability to use the necessary instruments to carry out a monetary valuation of all the consequences that may result from the introduction of a new drug or any other kind of medical technology by means of cost-benefit analysis techniques.

Content:

Teaching Unit 1. Methods for the Economic Evaluation of Pharmaceuticals, Medical Technologies and Health Programs.

1.1. The need to count.

1.2. What steps are taken in an economic evaluation?

Teaching Unit 2. Cost Analysis in Economic Evaluation (1).

- 2.1. Estimating the costs of a new treatment.
- 2.2. Discounting.
- 2.3. The distinction between average cost and marginal cost.

Teaching Unit 3. Cost-Utility Analysis.

- 3.1. Estimating the benefits of treatment alternatives.
- 3.2. Using and calculating Quality-Adjusted Life Years (QALYs).
- 3.3. Designing a cost-utility analysis (CUA).

Teaching Unit 4. Cost-Benefit Analysis (1).

- 4.1. Is it useful to value the outcome in monetary terms?
- 4.2. First steps towards obtaining a measure of net monetary value.
- 4.3. Valuing the outcome in terms of willingness to pay.

In the practical activity participants will analyze how different countries develop economic evaluations of pharmaceuticals. This activity will be individual.

Calendar of the Course:

| Course 1. Economic Evaluation of Pharmaceuticals and Medical Technologies (1): Basic Concepts | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 03/03/2021 | 16/03/2021 | 10/03/2021 |
| Teaching Unit 2 | 17/03/2021 | 30/03/2021 | 24/03/2021 |
| Teaching Unit 3 | 31/03/2021 | 13/04/2021 | 07/04/2021 |
| Teaching Unit 4 | 14/04/2021 | 27/04/2021 | 21/04/2021 |
| Practical activity Course 1 | | 04/05/2021 | |
| Break and Retake period of end-of-unit exercises in Course 1 | | | 28/04/2021 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will **ONLY** affect the end-of-unit exercises (tests).

COURSE 2

Quantitative Techniques Applied to Health Service and Pharmacy Management

Author: Carles Murillo
Professor: Jaime Pinilla Domínguez

General aim:

The aim of this Course is to provide the basic tools for analysing the overall behaviour of variables of interest for pharmaceutical and health management. Participants learn how to interpret the results of a selection of statistical and econometric analysis techniques that can be useful in decision-making in this area.

Specific objectives:

- To quantify the relevant indicators of the magnitude of the pharmaceutical and health sector and make comparisons over time and between regions. To measure the association between health and pharmaceutical expenditure and income.
- To establish the elements involved in a linear regression model, which provides an estimation of the relationship between a variable (the behaviour of which we are interested in explaining) that is representative of the effects of a treatment and the factors determining its variations.
- To interpret the results of a predictive equation of variations in pharmaceutical expenditure in primary care health centres and to use these estimations to establish budget allocation mechanisms for an efficient distribution of resources.
- To design a model explaining variations in medical practice as regards drug prescription by physicians depending on personal, professional and work environmental factors.
- To acquire sufficient knowledge to judge and to interpret the results of a model that measures the association between variables.

Content:

Teaching Unit 1. Measuring the relationship between health care expenditure and income.

- 1.1. Association between drug expenditure and income.
- 1.2. Measurement of the degree of association between expenditure and income.
- 1.3. Simple regression as an instrument for evaluating the predictive ability of income.
- 1.4. Evaluation of the results of the analysis: How to determine the significance of the fit.

Teaching Unit 2. Factors Determining the Efficacy of a Treatment.

- 2.1. Proposed method for determining a treatment's efficacy.
- 2.2. Factors determining changes in the outcome of a treatment.
- 2.3. Determining the weight of each explanatory variable.
- 2.4. Do the amount of drugs and personal characteristics determine the treatment's efficacy?
- 2.5. Statistical diagnosis of the model used.

Teaching Unit 3. Building pharmaceutical budgets.

- 3.1. Building pharmaceutical budgets in primary care.
- 3.2. What happens when an explanatory variable is a categorical variable?
- 3.3. Pharmaceutical expenditure in primary care teams.

Teaching Unit 4. Logistic Regression.

- 4.1. Regression models with a limited dependent variable.
- 4.2. Logit model (Logistic Regression).
- 4.3. Validation of the regression model.

In the Practical Activity participants are asked to prepare a research proposal for an empirical research project. This activity will be individual.

Calendar of the Course:

| Course 2. Quantitative Techniques Applied to Health Service Management | Beginning | End | Exercise opens |
|---|------------------|------------|-----------------------|
| Teaching Unit 1 | 05/05/2021 | 18/05/2021 | 12/05/2021 |
| Teaching Unit 2 | 19/05/2021 | 01/06/2021 | 26/05/2021 |
| Teaching Unit 3 | 02/06/2021 | 15/06/2021 | 09/06/2021 |
| Teaching Unit 4 | 16/06/2021 | 29/06/2021 | 23/06/2021 |
| Practical activity Course 2 | | 13/07/2021 | |
| Break and Retake period of end-of-unit exercises in Course 2 | | | 30/06/2021 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will ONLY affect the end-of-unit exercises (tests).

COURSE 3

Economics and Policies of Pharmaceutical Financing

Author: Jaume Puig-Junoy
Professor: Jaume Puig-Junoy

General aim:

The basic aim of this Course is to enable the participant to analyse the justification for and effectiveness of the main policies for the regulation and funding of pharmaceuticals in a health system

Specific objectives:

- To interpret and analyse the level and trend of spending and prices of drugs funded by an insuring body, and to interpret the distinctive characteristics of the pharmaceutical market and its implications for pharmaceutical financing.
- To get to know and evaluate basic economic instruments for choosing and analysing drug management and funding policies, with emphasis on those that involve the application of co-payment (whereby the patient shares the cost of the drug).
- To analyse the advantages and disadvantages of the various systems of drug price fixing and regulation that are applied in the compared system.
- To analyse the main economic effects of patents, as the principal barrier to competition in the pharmaceutical market, and the economic effects of the main policies aimed at encouraging competition in this market (generic policies and reference pricing).

Content:

Teaching Unit 1. Pharmaceutical Expenditure: Interpretation and Distinctive Features of the Market.

- 1.1. Interpreting pharmaceutical expenditure.
- 1.2. What are the causes of rises in drug prices?
- 1.3. The distinctive features of the pharmaceutical market.

Teaching Unit 2. Insurance and the Demand for Pharmaceuticals.

- 2.1. Drug management policies.
- 2.2. Co-payment in health services.
- 2.3. The effects of co-payment on health services and pharmaceuticals.

Teaching Unit 3. Pharmaceutical Price Regulation.

- 3.1. Reasons for regulating pharmaceutical prices.
- 3.2. Pharmaceutical price regulation systems.
- 3.3. The effects of price regulation.

Teaching Unit 4. Patents and Policies Encouraging Competition in the Pharmaceutical Market.

- 4.1. The role of patents in the pharmaceutical market.
- 4.2. Is competition possible in the pharmaceutical market?
- 4.3. Pharmaceutical reference pricing systems.

The practical activity will be an analysis of pharmaceutical policies in a group of countries. This activity will be in groups.

Calendar of the Course:

| Course 3. Economics and Policies of Pharmaceutical Financing | <i>Beginning</i> | <i>End</i> | <i>Exercise opens</i> |
|---|-------------------------|-------------------|------------------------------|
| Teaching Unit 1 | 25/08/2021 | 07/09/2021 | 01/09/2021 |
| Teaching Unit 2 | 08/09/2021 | 21/09/2021 | 15/09/2021 |
| Teaching Unit 3 | 22/09/2021 | 05/10/2021 | 29/09/2021 |
| Teaching Unit 4 | 06/10/2021 | 19/10/2021 | 13/10/2021 |
| Practical activity Course 3 | | 26/10/2021 | |
| Break and Retake period of end-of-unit exercises in Course 3 | | | 20/10/2021 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will **ONLY** affect the end-of-unit exercises (tests).

COURSE 4

Economic Evaluation of Pharmaceuticals and Medical Technologies (2): Advances

Author: Jaume Puig-Junoy
Professor: Jaume Puig-Junoy

General aim:

The general aim of this Course is to familiarise the participant with some recent advances in the use of techniques and instruments for the economic evaluation of pharmaceuticals and medical technologies and apply them to several case studies. This is the second of two teaching Courses that pursue this objective.

Specific objectives:

- To become familiar with the main controversies and methodological problems that arise when we incorporate indirect or productivity costs into an evaluation, and to acquire criteria for assessing the quality of a cost estimation.
- To design and analyse, from a critical point of view, an economic evaluation study that employs the declared preference techniques most commonly used in cost-benefit evaluation of health services, the contingent valuation technique and joint analysis.
- To acquire criteria for decision-making on data collection, concerning both outcomes and costs, in an economic evaluation, and on the need to apply various modelling and sensitivity analysis techniques to the available data.
- To get to know and to evaluate the main criteria and ways of presenting, using and applying the results of economic evaluation studies of pharmaceuticals and medical technologies.

Content:

Teaching Unit 1. Cost Analysis in Economic Evaluation (2).

- 1.1. Cost-of-Illness Studies.
- 1.2. Methods of valuing paid and unpaid time in health production.
- 1.3. The quality of economic evaluation studies in cost calculation.
- 1.4. Budget impact analysis.

Teaching Unit 2. Cost-Benefit Analysis (2): Methods of Estimating Willingness to Pay

- 2.1. Designing a contingent valuation study.
- 2.2. Designing a conjoint analysis.

Teaching Unit 3. Models and Uncertainty in Economic Evaluation.

- 3.1. Economic evaluation and clinical trials.
- 3.2. Modelling techniques.
- 3.3. Sources of uncertainty in economic evaluation

Teaching Unit 4. Use and Application of Economic Evaluation in Decision-Making.

- 4.1. Decision criteria in cost-effectiveness and cost-utility analysis.
- 4.2. Presentation of the study and use of the results in decision-making.
- 4.3. Economic evaluation and pharmaceutical policy.

The Practical Activity will consist in preparing a critical assessment of a cost-of-illness study. This activity will be individual.

Calendar of the Course:

| Course 4. Economic Evaluation of Pharmaceuticals and Medical Technologies (2): Advances | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 27/10/2021 | 09/11/2021 | 03/11/2021 |
| Teaching Unit 2 | 10/11/2021 | 23/11/2021 | 17/11/2021 |
| Teaching Unit 3 | 24/11/2021 | 07/12/2021 | 01/12/2021 |
| Teaching Unit 4 | 08/12/2021 | 28/12/2021 | 22/12/2021 |
| Practical activity Course 4 | | 04/01/2022 | |
| Break and Retake period of end-of-unit exercises in Course 4 | | | 29/12/2021 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will ONLY affect the end-of-unit exercises (tests).

COURSE 5

Drug Management in Health Systems

Authors: Lluís Segú and Gonzalo de Miguel
Professor: Lluís Segú

General aim:

The general aim of this Course is to make the participant aware of the possibilities of applying rational drug use in order to guarantee the best possible use of pharmacological resources from the point of view of both the effectiveness and the efficiency of pharmacological interventions and apply it to a number of case studies.

Specific objectives:

- To define the concept of drug management and integrate it into a broader concept of health systems and services management.
- To identify and become familiar with the various agents involved in drug management, their perspectives, functions and responsibilities, and the instruments they employ in this field.
- To explore the role of micromanagement in the pharmaceutical management of health systems and identify the political, strategic and technical elements that can develop in these environments.
- To identify all the structural, organisational and instrumental elements related to drug management in health services.
- To identify and define strategies for integrating drug management into the overall management of health services.
- To be able to develop a drug management plan in a supply environment, identifying its needs, phases, objectives and resources.
- To know the management basics of the introduction of new drugs into the market by the pharmaceutical industry.

Content:

Teaching Unit 1. Can We Manage Pharmaceuticals in Health Systems? The Micromanagement Approach.

1.1. Pharmaceutical policy: The difference between looking and seeing.

1.2. Factors influencing the use of drugs: What are we up against in management?

1.3. How to begin managing drugs: What we need to know and analyse.

Teaching Unit 2. The Development Process of New Drugs: The Perspective of the Pharmaceutical Industry.

- 2.1. Development process of a new drug.
- 2.2. Interactions with regulatory authorities in the development of new drugs.
- 2.3. International drug development. Project management.
- 2.4. Assessment of development projects in the pharmaceutical industry: The NPV decision tree method.
- 2.5. Pharmacoeconomics in the pharmaceutical industry.

Teaching Unit 3. Elements for Drug Management in Health Systems: The Micromanagement Approach.

- 3.1. Micromanagement of drugs: Strategy, tactics and techniques.
- 3.2. Acting on the drug: Selecting pharmaceuticals and incorporating new ones.
- 3.3. From managing the drug to managing its use: Who for, when, how and why?

Teaching Unit 4. Operationalisation of Drug Management in Microenvironments: Information, Responsibility Sharing, Integration and Evaluation.

- 4.1. Sharing responsibility among the professionals: A crucial element based on information, participation and responsibility.
- 4.2. Elements of operational support for a drug management plan: Integration, training and evaluation.
- 4.3. Development of an operating plan for drug management in the “Healthy South” complex.

In the Practical Activity participants will have to analyse a pharmacoeconomics-related problem and propose a measure/policy to solve it by following the conceptual stages presented in the Course. This activity will be individual.

Calendar of the Course:

| Course 5. Drug Management in Health Systems | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 05/01/2022 | 18/01/2022 | 12/01/2022 |
| Teaching Unit 2 | 19/01/2022 | 01/02/2022 | 26/01/2022 |
| Teaching Unit 3 | 02/02/2022 | 15/02/2022 | 09/02/2022 |
| Teaching Unit 4 | 16/02/2022 | 01/03/2022 | 23/02/2022 |
| Practical activity Course 5 | | 08/03/2022 | |
| Break and Retake period of end-of-unit exercises in Course 5 | | | 02/03/2022 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will ONLY affect the end-of-unit exercises (tests).

COURSE 6

Health Economics (1): Supply

Authors: Marisol Rodríguez and Jaume Puig-Junoy
Professors: Teaching Units 1 and 2: Marisol Rodríguez
Teaching Units 3 and 4: Carlos Campillo

General aim:

The basic aim of this Course is to guide the participant in the economic analysis of the functioning of the health sector and the economic behaviour of the agents involved in it, with special reference to the application of economic concepts and instruments to the management of health services. This aim is pursued jointly with the Course 7 of this program.

Specific objectives:

- To gain an overview of health economics as an instrument for analysing problems in the area of health and medical services.
- To become familiar with the economic approach to health determinants and have access to instruments for analysing expenditure on health.
- To understand the economic functioning of markets of goods and services, with special emphasis on the characteristics that differentiate these markets from conventional economic markets and justify public intervention.
- To analyse and understand the economic characteristics of the production and costs of health service providers and the expected effects on them of the various alternative physician and hospital payment systems.

Content:

Teaching Unit 1. Economics and its Applicability to the Field of Health.

- 1.1. Understanding economics in three acts and an epilogue.
- 1.2. Economics applied to the area of health care

Teaching Unit 2. The Health Production Function and the Analysis of Health Expenditure.

- 2.1. The health production function.
- 2.2. Analysis of spending on health services.

Teaching Unit 3. Markets for Health Goods and Services.

- 3.1. Economic relationships in the production and use of health services.
- 3.2. Failures of the health services market.
- 3.3. Failures of the private health insurance market.

Teaching Unit 4. Costs, Payment Systems and Incentives in the Production of Health Services.

- 4.1. Production and costs in health services.
- 4.2. Efficiency in the production of health services.
- 4.3. Physician payment systems.
- 4.4. Hospital funding systems.

In the practical activity participants will have to make a critical commentary on a recent news item related to the contents of the unit. This activity will be individual.

Calendar of the Course:

| Course 6. Health Economics (1) | Beginning | End | Exercise opens |
|--|------------------|------------|-----------------------|
| Teaching Unit 1 | 23/03/2022 | 05/04/2022 | 30/03/2022 |
| Teaching Unit 2 | 06/04/2022 | 19/04/2022 | 13/04/2022 |
| Teaching Unit 3 | 20/04/2022 | 03/05/2022 | 27/04/2022 |
| Teaching Unit 4 | 04/05/2022 | 17/05/2022 | 11/05/2022 |
| Practical activity Course 6 | | 24/05/2022 | |
| Break and Retake period of end-of-unit exercises in Course 6 | | | 18/05/2022 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will **ONLY** affect the end-of-unit exercises (tests).

COURSE 7

Health Economics (2): Demand

Authors: Marisol Rodríguez, Carles Murillo and Jaume Puig-Junoy

Professors: Teaching Units 1 and 4: Marisol Rodríguez

Teaching Units 2 and 3: Carlos Campillo-Artero

General aim:

The basic aim of this Course is to guide the participant in the economic analysis of the functioning of the health sector and the economic behaviour of the agents involved in it, with special reference to the application of economic concepts and instruments to the management of health services. This aim is pursued jointly with the Course 6 of this program.

Specific objectives:

- To distinguish between the ways in which need and demand are opposed as resource allocation criteria.
- To distinguish between the demand for health and the demand for medical care and health services, understanding the latter as being derived from the former.
- To evaluate the results of the observed variability in health care activity and the importance of analysing its possible sources of variation for the design of economic policies.
- To use instruments of economic analysis to analyse and evaluate the impact of technology on the decision to either produce health services directly or to outsource them.
- To get to know the peculiarities of internal markets of public competition.
- To distinguish between different ways of understanding equity in the distribution of resources and to measure health inequalities.

Content:

Teaching Unit 1. The Demand for Health and for Medical Care.

1.1. Demand and need: two different models to answer the same question.

1.2. Demand and investment in health: the Grossman model.

1.3. Empirical estimation of demand: the role of the different explanatory variables.

Teaching Unit 2. Variability in Medical Practice (VMP).

- 2.1. What we mean by variability in medical practice?
- 2.2. Trying to identify the magnitude of variability.
- 2.3. Arguments explaining VMP and policy orientation.

Teaching Unit 3. Technology, Outsourcing and Competition in Health Services.

- 3.1. Technology in the production of health services.
- 3.2. Outsourcing or direct production?
- 3.3. Competition and the organisation of health services.

Teaching Unit 4. The Goal of Equity in Health: Theory and Applications.

- 4.1. The concept of equity in health.
- 4.2. Empirical evidence of the existence of socioeconomic inequalities in health.
- 4.3. The responsibility/contribution of health systems to (in)equity.

The practical activity is the development of a conceptual map of the contents of the Course.
This activity will be individual.

Calendar of the Course:

| Course 7. Health Economics (2) | <i>Beginning</i> | <i>End</i> | <i>Exercise opens</i> |
|--|-------------------------|-------------------|------------------------------|
| Teaching Unit 1 | 25/05/2022 | 07/06/2022 | 01/06/2022 |
| Teaching Unit 2 | 08/06/2022 | 21/06/2022 | 15/06/2022 |
| Teaching Unit 3 | 22/06/2022 | 05/07/2022 | 29/06/2022 |
| Teaching Unit 4 | 06/07/2022 | 19/07/2022 | 13/07/2022 |
| Practical activity Course 7 | | 26/07/2022 | |
| Break and Retake period of end-of-unit exercises in Course 7 | | | 20/07/2022 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will **ONLY** affect the end-of-unit exercises (tests).

COURSE 8

Modelling Techniques in the economic evaluation of pharmaceuticals and healthcare technologies

Authors: José Manuel Rodríguez and Carlos Crespo
Professors: Teaching Units 1 and 2: José Manuel Rodríguez
Teaching Units 3, 4 and 5: Carlos Crespo

General aim:

The basic aim of this Course is to provide the participant with the practical skills and abilities needed when looking for solutions to a problem of economic evaluation in healthcare. Thus, the concepts of decision analysis and of modelling techniques for economic evaluation will be reviewed in order to emphasise the practical development of models of decision analysis and Markov models that compare several courses of action, healthcare programs, health intervention procedures or complementary treatments. Throughout the Course, the participant will deal with the typical problems involved in the practical application of economic evaluation models and will develop different techniques for solving them.

Specific objectives:

- To apply, interpret, evaluate and develop the main types of modelling techniques for the economic evaluation of medicaments, medical technologies and healthcare programs.
- To identify the use and the potential for the application of these modelling techniques in the area of economic evaluation studies of technologies and healthcare programs.
- To use the normal existing software for the development of these techniques.

Content:

Teaching Unit 1. Introduction to modelling techniques in economic evaluation studies for healthcare technologies.

1.1. Basic concepts.

1.2. Model types and justification of their use.

1.3. Advantages and disadvantages of the models.

1.4. Guidelines for the critical appraisal of economic evaluation models.

1.5. Basic knowledge of Excel for economic evaluation.

Teaching Unit 2. Elaboration phases of a model.

2.1. Conceptualization of the medical problem.

2.2. Conceptualization of the model.

- 2.3. Estimation of probabilities, use of resources, costs and uses.
- 2.4. Calculation of the expected values.
- 2.5. Graphical presentation of the models.
- 2.6. Sensitivity analysis.
- 2.7. Transferability of results of economic evaluations.

Teaching Unit 3. Introduction to Markov models.

- 3.1. Basic concepts.
- 3.2. Graphical presentation of a Markov model.
- 3.3. Dissemination of the Cohort.

Teaching Unit 4. Advantages of Markov models. Dealing with uncertainty in probabilistic models

- 4.1. Uncertainty
- 4.2. Probabilistic model.
- 4.3. Graphical presentation of results.
- 4.4. Expected value of perfect information.

Teaching Unit 5. Statistical techniques and tools for the elaboration of decision models

- 5.1. Probabilities calculation.
- 5.2. Regression based calculations.
- 5.3. Advantages and disadvantages of the modelling software.
- 5.4. Sample size for cost effectiveness studies.

The practical activity is the development of a time dependent Markov model. This activity will be in groups, although some questions will be individual.

Calendar of the Course:

| Course 8. Modelling Techniques in the economic evaluation of pharmaceuticals and healthcare technologies | Beginning | End | Exercise opens |
|---|------------------|------------|-----------------------|
| Teaching Unit 1 | 31/08/2022 | 13/09/2022 | 07/09/2022 |
| Teaching Unit 2 | 14/09/2022 | 27/09/2022 | 21/09/2022 |
| Teaching Unit 3 | 28/09/2022 | 11/10/2022 | 05/10/2022 |
| Teaching Unit 4 | 12/10/2022 | 25/10/2022 | 19/10/2022 |
| Teaching Unit 5 | 26/10/2022 | 08/11/2022 | 02/11/2022 |
| Practical activity Course 8 | | 22/11/2022 | |
| Break and Retake period of end-of-unit exercises in Course 8 | | | 09/11/2022 |

IMPORTANT: There is no recovery period for the practical activity. The retake period will ONLY affect the end-of-unit exercises (tests).

TERM PAPER

Academic responsables: Carlos Campillo-Artero and Jaume Puig-Junoy

NOTE: A document with specific instructions regarding the Term Paper will be published on the online platform of the program around two months before proposal submission.

General aim:

To write a document, on a topic chosen by each participant, containing elements of economic analysis on one of the subjects covered in the program.

Specific objectives:

- To become acquainted with the procedures for applying the scientific method to identify problems related to the management of health services and pharmaceuticals, and to learn how to go about solving them using the tools developed in the various Courses of the Master's Degree in Health Economics and Pharmacoeconomics.
- To encourage the integration of the concepts, theories and methods of observation and analysis related to the study of the management of health services and pharmaceuticals.
- To promote theoretical and applied research into health economics and pharmacoeconomics.

Content:

The Term Paper should not be a theoretical or conceptual excursion. On the contrary, it should contribute evidence, and therefore it is essential that it includes statistical information, whether quantitative or qualitative. The work must be original and not simply a reproduction of results obtained by other authors.

The document should have an approximate length of at least 3,000 words and no more than 5,000, including tables, figures and bibliographical references.

The document should be organised in such a way that it is simple to identify the background to the topic, the objectives of the work, the material and method of analysis used, the results obtained and the discussion of these results.

The research must be original, that is, the final work must not have been developed previously by any person other than the author of the Term Paper.

Tutor:

The tutor will be assigned on an individual basis, depending on the subject and or the methods chosen for the Term Paper. We count on a highly expert team of more than 40 tutors who are academics and professionals in the field. The academic responsible of the Term Paper will assign each participant a tutor, who will monitor and control the assignment and will provide support to face any doubts the participant might have while working on it.

Calendar of the Term Paper:

| Term Paper | Beginning | End |
|--|------------------|------------|
| Getting familiar with the Term Paper Guide | 09/02/2022 | 08/03/2022 |
| Topic Proposal | 09/03/2022 | 22/03/2022 |
| Proposal acceptance | 23/03/2022 | 29/03/2022 |
| Assignment of tutor | 30/03/2022 | 12/04/2022 |
| Consultation period | 13/04/2022 | 29/11/2022 |
| Evaluation period | 30/11/2022 | 13/12/2022 |
| Term Paper grades | 14/12/2022 | 20/12/2022 |

Study method

The program will be taught entirely online, in distance format. This involves a specific teaching methodology, with intensive use of the virtual classroom (eCampus) and appropriate evaluation mechanisms.

The teaching method used during the course will be based on case studies and participation in discussion forums. All the topics in the program will feature a number of tests consisting of self-assessed multiple-choice questions.

The first 7 COURSES are divided into 4 TEACHING UNITS, with the exception of Course 8, which has 5 Teaching Units, and the Term Paper in which the participant is expected to write a research paper.

Each Course comprises:

1. **TEACHING UNITS** – (4 except for Course 8, which has 5), including:
 - a. A precise description of the **OBJECTIVES** and the skills the participant will be expected to acquire in the teaching unit.
 - b. An **INTRODUCTORY TEST** which the participant will be required to take before proceeding to the teaching unit.

- c. The **CONTENT** of the teaching unit, which participants will be able to access either online or by downloading a printable document.
 - d. The **ACTIVITIES** corresponding to the content of the teaching unit, which consist of self-assessed multiple-choice questions with automatic feedback for each possible answer. Answers are only available in the online version.
 - e. A **VIDEOTUTORIAL** solving an activity with practical orientation from each Teaching Unit. Together with the video, the Excel template used is available so that the activity can be solved.
 - f. **COMPLEMENTARY MATERIALS**. Each unit has a folder with non-compulsory materials to complement and extend the topics introduced in the unit. A **READING GUIDE** is also available to list and summarize the content of each material.
2. An **END-OF-UNIT EXERCISE** for each teaching unit. It will be made up of 10 multiple-choice questions with 4 possible answers, with only one correct option. Participants may check the instructions given in the eCampus before proceeding and they are given a mark on the spot.
 3. **PRACTICAL ACTIVITY** – There will be one final activity to be done at the end of each Course. The type of activity as well as its learning goals will be different for each Course. Check the calendar to see the opening and closing dates for accessing the practical activity, that does not have a retake period.
 4. **DISCUSSION FORUM** – To ask questions, doubts and comments and to debate about the contents and topics, each Course will have a discussion forum. Questions will be answered publicly, allowing to other students to solve the same doubts. Participants are also encouraged to suggest topics of their own interest that are related to the contents covered in the Course.

During the academic year, live webinars with experts about topics and contents from the program will be programmed. You will receive the invitation to join the webinars live. These contents will not be exam material.

Tips for effective learning

- Starting with the Teaching Unit: it is recommended to start working on the first day of its teaching period (always on Wednesday) by reading the OBJECTIVES.
- Doing the Introductory Test: before you start studying the main text.
- Studying the Teaching Unit: it is recommended to analyse and revise the contents of the main text carefully. In this respect, it is very important that you contact the professor in charge of this Course if you have any doubts or questions through the discussion forum. The tutor will attend your queries about the contents of

a teaching unit, only during its corresponding period in the academic calendar.

- Teaching Unit Activities: while you study the contents of the Teaching Unit, you will find some interactive activities. The answers to these questions will only be shown in the online platform. We encourage to watch the videotutorial of the Unit to solve questions about the specific activities.
- End-of-unit Exercise: it is recommended to do it during the last week of the teaching unit. Participants are given 2 attempts for each end-of-unit exercise. The first one will be available during the ordinary period of the Course, while the second one will be opened once the retake period starts. Second attempts can be used either to improve the first mark or to pass a previously failed attempt. The highest of the two grades (attempts) will count as your grade for the teaching unit.
- Practical Activity: this activity should be done after working through all the Teaching Units of the Course. There is no retake period for the practical activity.
- Complementary materials: we encourage, if necessary, to work the additional materials to complement and extend the topics introduced in the unit, particularly topics of personal or professional interest.
- **IMPORTANT:** Following the calendar of the program is essential to maximize the learning outcomes of the materials, resources and guidance by the professors. It is encouraged to study and attempt the tests during the designated period in the calendar.

Assessment criteria

The assessment components are set and marked according to the quality criteria of the UPF Barcelona School of Management programs, which guarantee their academic value and their recognition.

In order to be awarded the official Master's Degree in Health Economics and Pharmacoeconomics, it is required to pass all the Courses in your program.

The final grade in each Course is calculated as 75% of the average grade in the end of unit exercises and 25% of the grade in the practical activity.

It is important to clarify that Brush Up Courses (if compulsory) are required to obtain the Master's Degree but do not compute in the final grade.

The Master's Degree in Health Economics and Pharmacoeconomics consists of a total of 60 credits (ECTS). Thus, your final grade will be the weighted average of the credits distribution along its courses. Courses 1 to 7 are each worth 6 credits; Course 8 is worth 8 credits and the Term Paper is worth 10 credits.

ASSESSMENT COMPONENTS (FOR COURSES 1 TO 8)

1. END-OF-UNIT EXERCISES – 75% of the final grade of each Course.

Each Course has 4 End of Unit Exercises (except Course 8, with 5 end of unit exercises). The end-of-unit exercise is considered as passed if the participant obtains a minimum of 5 correct answers out of the total of 10 questions.

You will have a second attempt to take the End-of-Unit Exercise during the retake period, aimed at either passing the teaching unit or improving the qualification obtained. The opening date to access this second attempt is specified in the calendar. In the retake End-of-Unit Exercises the same assessment criteria will apply.

For each Course, the final grade will only be considered as passed ONLY IF at least 3 end of unit exercises are passed, out of the 4 of each Course (i.e. minimum grade of 5 out of 10 for each of them). In case of Course 8, the requirement is to pass at least 4 end of unit exercises out of the 5 Teaching Units. **If this criterion is not fulfilled, despite that the final grade is higher than 5, the Course will be considered as failed.**

2. PRACTICAL ACTIVITY – 25% of the final grade of each Course

The practical activity content and format may vary from course to course. It will not be possible to retake the practical activities in a later period than the established in the calendar. Therefore, if you do not submit the practical activity in its ordinary period, the highest grade that you can obtain in the Course is 7.5/10 (assuming that you obtain the maximum mark in each of the 4 end-of- unit exercises of the Course). Practical activities of Courses 3 and 8 will be in groups.

Example: Simulation of grades in a Course

| Student | TU 1 | TU 2 | TU 3 | TU 4 | Practical Activity | Weighted grade | Final grade |
|---------|------|------|------|------|--------------------|----------------|---|
| W | 9 | 7 | 5 | 3 | NP | 4,5 | Fail |
| X | 9 | 9 | 8 | 6 | 8 | 8 | Good |
| Y | 9 | 9 | 4 | 4 | 6 | 6,4 | Fail. At least an additional unit needs to be passed. |
| Z | 9 | 9 | NP | NP | 9 | 5,6 | Fail. At least an additional unit needs to be passed. |

*NP: Not presented-

TERM PAPER ASSESSMENT

The Term Paper will be assessed according to the criteria included in the specific study guide that you will access before having to prepare your topic proposal.

GRADING SCALE OF THE PROGRAM

The grading scale of the program goes from 0 to 10, considering 5 as the minimum grade to pass.

The corresponding categories for the 0-10 points scale are the following:

| | |
|-----------|-----------|
| FAIL | 0 – 4.9 |
| PASS | 5.0 – 6.9 |
| GOOD | 7.0 – 8.9 |
| EXCELLENT | 9.0 – 10 |

IDENTITY CHECK

Following UPF Barcelona School of Management criteria, on a random basis, program directors may ask students to undergo an 'identity check' aimed at verifying the identity of the participant in the program's courses. The refusal of the selected participant to join the meeting may lead to the cancellation of enrolment in the program.

IMPORTANT: In order to protect the intellectual property of the authors of the different works and facilitate the evaluation of the teachers, Turnitin will be used as a plagiarism prevention tool. Therefore, you must read carefully and accept the delivery conditions of this plugin in all programmed activities.