

# Biomedical Informatics Doctoral Programme and Lifelong Education

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## Abstract

Educational programmes in the area that we nowadays refer to as biomedical informatics cover topics from the field of medical informatics, healthcare informatics and bioinformatics. The conceptual roots of such programmes lead back more than thirty years and the programmes are well established in many countries. New approaches and e-learning tools applied to doctoral programme in biomedical informatics running at Charles University in Prague and lifelong education are introduced and discussed.

## Keywords:

Biomedical informatics, Education, e-learning, Communication, Information technologies

## Introduction

Educational programmes in the area of biomedical informatics are demonstrated by an doctoral programme in biomedical informatics running at Charles University in Prague.

## Doctoral Programme in Biomedical Informatics

The doctoral programme in Biomedical Informatics was accredited in 2001 and is running in Czech and English languages. Since the start of the Biomedical Informatics Programme in 2001 65 students has passed the entrance examinations. Some courses approved by Specialists Board of Biomedical Informatics are often selected by doctoral students of other programmes and they are also used for lifelong education. Education in biomedical informatics for doctoral students in biomedicine and lifelong education has been often supported by courses with e-learning tools.

## Courses in Biomedical Informatics for doctoral programmes and lifelong education

E-learning tools can support lifelong education and doctoral programmes in biomedicine. The main reason for use of e-learning tools is related to flexibility in time and place, limitations of cost and possibility to use e-learning tools by students in their own place and time. We use the following e-learning tools.

- interactive electronic books,
- audio presentations of the lectures and videofilms,
- system Bayes,
- system TECOM,
- system ExaMe.

## Interactive electronic books

We have developed two editions named “Biomedical Informatics” and “Biomedical Statistics” of books in the Czech language. The books are published by the Carolinum Printing House of Charles University in Prague and their interactive versions are available for teachers and students in the courses.

## Audio presentations of lectures and videofilms

Audio presentations of lectures given in five courses with different biomedical informatics topics were developed. The courses are also enriched by videofilms. For example the videofilm on electronic health record can show an e-health application running at the University Hospital in Motol presenting the lifelong voice controlled dental cross based on structured electronic health record.

## System BAYES

The software tool demonstrates the Bayesian approach by generating numeric examples and thus helps students to understand the basic principles of the method including sensitivity and specificity of a test, prevalence of a disease, the ROC curve, etc.

## System TECOM

The *TECOM* system supports teaching of medical decision-making. Its use for decision-making in cardiology is demonstrated.

## System ExaMe

System ExaME is based on *generalized multiple-choice questions*, with no prior restrictions on the number of given answers. Evaluation by the ExaMe system is performed using fixed or automated tests.

## Acknowledgement

The work was supported by the project 1M06014 MSMT CR