**COURSE OUTLINE**

1. **GENERAL**

|  |  |
| --- | --- |
| **SCHOOL** | SCHOOL OF HEALTH |
| **DEPARTMENT** | BIOLOGICAL APPLICATIONS AND TECHNOLOGY |
| **CURICULUM OF STUDIES** | UNDERGRATUATE |
| **LESSON CODE NUMBER** | **BEE705** | **SEMESTER** |  |
| **LESSON TITLE** | **ORIGINS AND SPREAD OF INFECTIOUS DISEASES** |
| **TEACHING ACTIVITIES** | **TEACHING HOURS PER WEEK** | **ECTS** |
| Theory | 2 | 3 |
| Lab | 1 |
| **COURSE TYPE** | Specialised and general knowledgeSkills Development |
| **PREQUISITIES:** | Up to 30 students |
| **TEACHING AND EXAMINATION LANGUAGE:** | English |
| **ERASMUS** | The course is offered to exchange students. |

1. **LEARNING OUTCOME**

|  |
| --- |
| **LEARNING OUTCOME** |
| The students would learn how to* Understand epidemics using ecological and evolutionary approach
* interpret epidemiological data
* construct models of epidemics
* apply statistical models to epidemiological data
* devise responses to epidemics
 |
| **GENERAL SKILLS** |
| * Apply knowledge in practice
* Analyze epidemiological problems using evolutionary/ecological approaches
 |

1. **COURSE CONTENTS**

|  |
| --- |
| This course considers epidemics from the ecological, evolutionary and population-dynamics perspective. Lectures will cover the following: 1. The ecological role of disease in natural ecosystems
2. The evolutionary context of disease
3. Microparasite types and vectors of disease. The key role of animals in mediating transmission of infectious diseases.
4. Case studies of epidemics and plagues in ancient and modern history: bubonic plague, Spanish influenza, Hong Kong influenza, SARS, AIDS, COVID-19
5. The SIR model 1 - Dynamics of an infectious disease
6. The SIR model 2 - Understanding and estimating the “R0” parameter
7. The SIR model 3 - Estimating parameters of an epidemic
8. Spatial infection models
9. Forecasting future outbreaks. Reservoirs of infection in wild animals, livestock markets and factory farms
10. Control techniques: quarantines, herd immunity, partial vaccination

Laboratory work: 1. Introduction to the R programming environment
2. R environment for epidemiology: “epimdr”, “outbreaks” and others
3. Simulating the dynamics of SIR model
4. Solving the spatial SIR model
5. Applying model solutions to real data
 |

1. **TEACHING AND LEARNING METHODS–EVALUATION**

|  |  |
| --- | --- |
| **COURSE OF TRAINING** | Face to face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES** | * Use of ICT in Course Teaching
* Use of ICT in Laboratory Teaching
* Use of ICT in Communication with Students
 |
| **TEACHING PROGRAMME** |

|  |  |
| --- | --- |
| ***ACTIVITY*** | ***WORKLOAD*** |
| Lectures | 26 |
| Laboratory exercises | 15 |
| Tutorial exercises | 15 |
| Process scientific papers | 18 |
| Use of pc applications | 9 |
| Total workload | ***83*** |

 |
| **STUDENT EVALUATION** | Written Exam (Summative)Written reports |

1. **ATTACHED BIBLIOGRAPHY**

|  |
| --- |
| Vynnycky, Emilia, and Richard White. *An introduction to infectious disease modelling*. OUP oxford, 2010.Bjørnstad, Ottar N. "Epidemics." *Models and data using R*. Springer International Publishing, 2018. |