Sveučilište u Zagrebu Agronomski fakultet
Svetošimunska cesta 25, 10000 Zagreb
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Environmental risk analysis and management (146059)

Nositelj predmeta

prof. dr. sc. Mario Njavro

Opis predmeta

Effective risk management is increasingly becoming recognized as a necessary condition for successful organizational performance. Consequently, the development of more systematic approaches to risk management is now a major concern across both the public and private sectors. Exposure to environmental risk affects farmers, agribusiness and society as a whole. All are subject to the costs and liabilities of environmental exposures. Decision makers and the public need reliable assessments of the consequences and probabilities of negative impacts on the environment.

ECTS: **3.00**

Engleski jezik: **R3**

E-učenje: **R1 (s elementima R2)**

Sati nastave: 30
Predavanja: 17
Vježbe u praktikumu: 7
Seminar: 6

Izvođač predavanja

- prof. dr. sc. Mario Njavro
- dr. sc. Tajana Čop

Izvođač vježbi

- dr. sc. Tajana Čop

Izvođač seminara

- prof. dr. sc. Mario Njavro
- dr. sc. Tajana Čop

Ocjenjivanje

Dovoljan (2): 61-70%
Dobar (3): 71-80%
Vrlo dobar (4): 81-90%
Izvrstan (5): 91-100%

Uvjeti za dobivanje potpisa

Students must attend the lectures. Students should submit exercises in a timely manner and achieve high level of quality

Opis

Written and oral exam. Seminar (Essay).

Vrsta predmeta

- Graduate studies / Environment, agriculture and resource management (Obvezni predmet, 3. semestar, 2. godina)

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Opće kompetencije

The module Environmental Risk Analysis and Management aims to develop the participants´ knowledge of a structured approach to deal with different risk and decision problems within the environmental field.
The Module focuses to develop knowledge about risk analysis methods with an emphasis on quantitative methods for risk assessment and risk management.
The Module follows risk analysis steps and covers the three main topics: Risk identification, risk analysis (focused on quantitative methods for risk assessment) and risk management.
The broad scope of the risk management explicitly recognizes the multi-disciplinary nature of most risk management issues and is concerned directly with the transfer and integration of concepts, techniques and best practice across different areas of application, environment in this case.

Oblici nastave

- Lectures
- Practicum
  Application of probability theory in risk analysis
- Seminars

Ishodi učenja i način provjere

Ishod učenja	Način provjere
Critically evaluate risk and decision problems within the environmental field;	Written and oral exam
Structurally and independently analyze risk (chose and apply quantitative methods in risk assessment),	Written and oral exam
Solve analytical decision problems within the field of environment	Written and oral exam
Decide, create and suggest adequate risk management strategies	Written and oral exam
independently and in cooperation. analyze the implementation of catastrophe and crisis management within authorities, companies and organizations	Seminar

Način rada

Obveze nastavnika

The teacher should lecture in the scheduled time. Prepare and supply students with the teaching materials (readings, assignments, web pages, statistical databases and other relevant material). Communicate with the students via e-mail and e-learning platform Merlin.

Obveze studenta

Attend class. Solve practical problems by submitting reports in accordance with the deadline or by providing answers through e-learning system

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Polaganje ispita

Elementi praćenja	Maksimalno bodova ili udio u ocjeni	Bodovna skala ocjena	Ocjena	Broj sati izravne nastave	Ukupni broj sati rada prosječnog studenta	ECTS bodovi
Lectures				24	24	0.5
Seminars	20%	0-60% 61-70% 71-80% 81-90% 91-100%	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	6	21	0.5
Exam	80%	0-60% 61-70% 71-80% 81-90% 91-100%	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)		45	2
Total	100	0-60% insufficient (1) 61-70% sufficient (2) 71-80% good (3) 81-90 very good (4)	(Exam*0.80)+(Seminar*0.20)	30	90	3

Elementi praćenja	Opis	Rok	Nadoknada
Exam	Written and oral exam. Written exam could take a form of assignment in which student is should apply risk analysis framework in the actual and relevant environmental problem.		

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Tjedni plan nastave

1. Risk and decision problems within the environmental field. L - Importance of risk and risk managemen in relation to the environment and decision management problems in both private and public sectors in the changing economy.
2. Risk and decision problems within the environmental field. Risk Sources and Characteristics L - Importance of risk and risk managemen in relation to the environment and decision management problems in both private and public sectors in the changing economy.. Sources of risk and their charatcteristics. Production risks, finacial risks, legal risks, human risks.
3. Risk Sources and Characteristics. Environmental risk assessmen L - Sources of risk and their charatcteristics. Production risks, finacial risks, legal risks, human risks. Application of the probability theory and statistics in risk analysis. Uncertainty measures: Decision tree, Influence diagram, Payoff matrix, Regret matrix.
4. Environmental risk assessment. Risk perception and attitude L - Application of the probability theory and statistics in risk analysis.Uncertainty measures: Decision tree, Influence diagram, Payoff matrix, Regret matrix. Utility as a basis for decision making. Measurement of utility. Cautions in the use of decision analysis
5. Risk perception and attitudes. Mathetamtical programming in environmental risk management L - Utility as a basis for decision making. Measurement of utility. Cautions in the use of decision analysis. Linear programming and optimization problems in decision management.
6. Mathetamtical programming in environmental risk management. Risk modelling. L - Linear programming and optimization problems in decision management. Simulation models, Monte Carlo simulations, stochastic simulation (Data analysis and selection of probability distributions)
7. Risk modelling L - Simulation models, Monte Carlo simulations, stochastic simulation (Data analysis and selection of probability distributions)
8. Risk Management L - Risk management strategies: on-site (company level) and risk transfer strategies (insurance, finance, commodity markets)
9. Risk Management. Application of probablity theory in risk analysis L+E - Risk management strategies: on-site (company level) and risk transfer strategies (insurance, finance, commodity markets) Data analysis and selection of probability distributions (borrowing strength, forecast ing, Bayes Theorem, influence diagrams, uncertainty estimation.
10. Application of probablity theory in risk analysis. Practice problems in mathematical programming E - Data analysis and selection of probability distributions (borrowing strength, forecast ing, Bayes Theorem, influence diagrams, uncertainty estimation. Presentation and interpretation of results and sensitivity analysis by use of mathematical programming.
11. Practice problems in mathematical programming. Practice problems in risk modelling E - Presentation and interpretation of results and sensitivity analysis by use of mathematical programming. Application of software tools in risk modelling (Decision tool suite: @Risk, Precision Tree...)
12. Practice problems in risk modelling E - Application of software tools in risk modelling (Decision tool suite: @Risk, Precision Tree...)
13. Case study 1. Case study 2 S - Risk Management, Environment and Agriculture Environmental risk management and biotechnology (use of GMO)
14. Case study 3. Case study 4 S - Environmental risk management and land use planning. Investment project and environmental risk management.
15. Case study 5 S - Development of insurnce products for environmental management

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Obvezna literatura

1. Hardaker J.B., Huirne, R.B.M, Anderson J.R., Lien, G.(2004.): Coping with risk in agriculture, second edition CABi Publishing, London, Velika Britanija
2. Babcock, B.A. i dr. (2003.): Risk Management and Environment: Agriculture in Perspective, Kluwer Academic Publishers
3. Douglas W. Allen, Dean Lueck (2004): The Nature of the Farm (Contracts, Risk, and Organization in Agriculture) The MIT Press, New Ed edition
4. Rejda, G.E. (2003.): Principles of Risk Management and Insurance, Addison Wesley, London, Velika Britanija
5. Nigel, S. (2003.): Agribusiness and Commodity Risks- Strategies and Management, Risk Books, London, Velika Britanija
6. Just, R.E. i Pope, R.D.(200.1): A Comprehensive Assessment of the Role of Risk in U.S. Agriculture, Kluwer Academic Publishers

Preporučena literatura

1. Risk Management (Rural Property Planning) Mike Krause(1997): Butterworth-Heinemann

Sličan predmet na srodnim sveučilištima

- Economics and Environmental Policy (4201-440) – Universität Hohenheim www.uni-hohenheim.de
- Environmental risk analysis and management:BOKU www.boku.ac.at
- Strategies for Environmental Risk and Hazard Assessments, 15 ECTS. Stockholm University sisu.it.su.se