University of Zagreb Faculty of Agriculture
Svetošimunska cesta 25, 10000 Zagreb
Phone: +385 (0)1 2393 777
E-mail: dekanat@agr.hr
Web: www.agr.unizg.hr

Risk Management in Agriculture (152083)

Course coordinator

Prof. Mario Njavro, PhD

Course description

Risk and uncertainty in agribusiness has been area of intensive scientific interest during last few decades. Biological characteristics of agriculture together with the new business environment which includes globalisation and liberalisation of the food and agricultural markets, climate change, livestock epidemics and plant diseases as well as food safety and security demands additionally emphasise risk component in business. On the other side, risk taking is preconditions of the business success or profit is nothing but premium on risk. In that establishment and application of efficient agricultural risk management become imperative. Module through lectures, auditory practice (including case studies) and seminars gives overview of the modern risk analysis, risk management and decision management theory.
Module enables students to reach expertise level in the risk analysis, application of the decision theory and business modelling and give them with tools for rational, efficient and scientifically based decision making under uncertainty.

ECTS: **6.00**

English language: **L3**

E-learning: **L1**

Teaching hours: 60
Lectures: 20
Practicum: 15
Seminar: 25

Lecturer

- Prof. Mario Njavro, PhD
- Prof. Vjekoslav Par, PhD

Associate teacher for exercises

- Prof. Mario Njavro, PhD

Associate teacher for seminars

- Prof. Mario Njavro, PhD

Grading

Sufficient (2): 61-70%
Good (3): 71-80%
Very good (4): 81-90%
Excellent (5): 91-100%

Conditions for obtaining signature

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

Description

Written and oral exam. Seminar (Essay).

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Type of course

- Graduate studies / MS Courses taught in English (Elective course, 1 semester, 1 year)

General competencies

Module qualifies students to critically evaluate risk and decision problems within the field of agribusiness; structurally and independently analyze risk and decide, create and suggest adequate risk management strategies

Types of instruction

- Lectures
  formal and informal lectures
- Auditory Exercises
  use of software in risk analysis, mathematical programming and simulations
- Seminars
  written and oral analysis of case studies in agribusiness

Learning outcomes

Learning outcome	Evaluation methods
Critically evaluate risk and decision problems within the field of agribusiness;	Written and oral exam. Seminar
Structurally and independently analyze risk	Written and oral exam. Seminar
Decide, create and suggest adequate risk management strategies	Written and oral exam. Seminar or case study analysis

Working methods

Teachers' obligations

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.

Students' obligations

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

Methods of grading

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Evaluation elements	Maximum points or Share in evaluation	Grade rating scale	Grade	Direct teaching hours	Total number of average student workload	ECTS
Lectures				33	33	1
Seminar	20%	0-60% 61-70% 71-80% 81-90% 91-100%	Insufficient (1) Sufficient (2) Good (3) Very good (4) Excellent (5)	25	47	1
1. partial exam	40%	0-60% 61-70% 71-80% 81-90% 91-100%	Insufficient (1) Sufficient (2) Good (3) Very good (4) Excellent (5)	1	50	2
2. partial exam	40%	0-60% 61-70% 71-80% 81-90% 91-100%	Insufficient (1) Sufficient (2) Good (3) Very good (4) Excellent (5)	1	50	2
Exam	80%	0-60% 61-70% 71-80% 81-90% 91-100%	Insufficient (1) Sufficient (2) Good (3) Very good (4) Excellent (5)		100	4
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)	60	180	6

Evaluation elements	Description	Deadline	Recoupment
Seminar	Application of risk analysis and risk management strategies in the real-life situations in agribusiness		
1. partial exam	Cover topics of risk sources and risk analysis	First half of semester	Might try or repeat at the first date of the winter exam period
2. partial exam	Risk management strategies	End of semester	Might try or repeat at the first date of the winter exam period

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Weekly class schedule

1. Introduction to risk in agriculture L - Risk and uncertainty; Sources of risk; A general approach to risk management in agriculture.
2. Decision analysis under uncertainty L - Probability theory; Risk measures; Decision trees; Efficiency criteria; Analysis using moments of the distribution; Stochastic efficiency methods.
3. Behaviour under risk L - Dominance; Utility as a basis for decision making; Utility functions; Information, processing capacity and judgment bias.
4. Simulation and mathematical programming models L - Stochastic simulation as a tool in decision analysis; Basic sampling techniques; Combining stochastic simulation and optimization. Mathematical programming approaches to whole-farm system planning under risk; Risk programming; Stochastic programming.
5. Risk and time L - Investment appraisal under uncertainty; Project feasibility analysis.
6. Risk management process L - Steps in risk management process; Analytic tools for assessment the effectiveness of risk management strategies.
7. On-farm risk management strategies L - Enterprise diversification; Portfolio theory.
8. Risk sharing strategies L - Insurance; financing; contracting; hedging on the commodity markets.
9. Risk considerations in agricultural policy making L - Government intervention and farm-level risk; Market failure for risk transfer; Emerging issues in risk management.
10. Computer labs Risk management in agriculture A - Practices using Excel: Decision tree, risk measures (expected utility, standard deviation, coefficient of variation), Bayesian statistics, utility. Introduction to @Risk software.
11. Modelling price and yield risk A - Modelling price and yield risk for crop and livestock products; Cumulative and probability density function.
12. Development of simulation models A - Stochastic budgeting models using Excel and @Risk.
13. Capital budgeting and risk 1 A - Implication of sensitivity and scenario analysis in investment appraisal; Stochastic decision trees for the analysis of investment decision. Case study 1.
14. Capital budgeting and risk 2 A - Capital structure, leverage and financial risk. Case study 2.
15. Insurance and portfolio analysis. State of affairs in risk management in agriculture. A, S - Effects of insurance and portfolio on business results. Case study 3. List of seminar topics: Risk analysis and food safety; Risk management and climate change; Risk and the environment; Innovative risk management tools (index insurance, weather derivates).

Obligatory literature

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. Vaughan. E. i Vaughan, T. (2000): Osnove osiguranja- upravljanje rizicima, MATE, Zagreb
3. Nigel, S. (2003.): Agribusiness and Commodity Risks- Strategies and Management, Risk Books, London, Velika Britanija
4. Rejda, G.E. (2003.): Principles of Risk Management and Insurance, Addison Wesley, London, Velika Britanija
5. Risk Management (Rural Property Planning) Mike Krause(1997): Butterworth-Heinemann

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Recommended literature

1. Barry P.J., Ellinger P.N., Hopkin J.A., Baker C.B.(2000.): Financial Management in Agriculture, Interstate Publishers, Inc., Danville, Illinois, SAD
2. Babcock, B.A. i dr. (2003.): Risk Management and Environment: Agriculture in Perspective, Kluwer Academic Publishers
3. Just, R.E. i Pope, R.D.(200.1): A Comprehensive Assessment of the Role of Risk in U.S. Agriculture, Kluwer Academic Publishers
4. Douglas W. Allen, Dean Lueck (2004): The Nature of the Farm (Contracts, Risk, and Organization in Agriculture) The MIT Press, New Ed edition

Similar course at related universities

- Decision Science 1(BSc) and Decision Science 2 (MSc)- Wageningen University
- Introduction to risk management- BOKU, University of Viena