



## RTU Course "Fundamentals of environmental scientific research"

11509 Vides aizsardzības un siltuma sistēmu katedra

### General data

Code	EAS508
Course title	Fundamentals of environmental scientific research
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Environmental Engineering and Management
Responsible instructor	Andra Blumberga
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Abstract	Study course provides basic knowledge about the process of scientific research including planning of scientific research, design and planning of experiments, performing experiments, uncertainty analysis, visualisation of experimental data, data processing and analysis methods, preparation of report and scientific publications.
Goals and objectives of the course in terms of competences and skills	To obtain knowledge and to be able to carry out scientific research based on planning of scientific research, design and planning of experiments, performing experiments, uncertainty analysis, visualisation of experimental data, data processing and analysis methods. To be able to prepare scientific report and scientific publications.
Structure and tasks of independent studies	Student carries out scientific research for selected environmental problem, including planning of scientific research, design and planning of experiments, performing experiments, uncertainty analysis, visualisation of experimental data, data processing and analysis methods, preparation of report and scientific publications and present it to during class.
Recommended literature	<ol style="list-style-type: none"> <li>1. Jeff Wu C.F., Hamada M.S. Experiments: Planning, Analysis, and Optimization (Wiley Series in Probability and Statistics). Wiley; 2nd edition, 2009, 760 lpp.</li> <li>2. Hofmann A.H. Scientific Writing and Communication: Papers, Proposals, and Presentations. Oxford University Press, USA, 2009, 704 lpp.</li> <li>3. Korner A.M. Guide to Publishing a Scientific Paper. Routledge; 1 edition, 2008, 120 lpp.</li> <li>4. Allison B. A Guide to dissertation preparation.(4th ed.) Leicester: De Montfort University, 1993.</li> <li>5. Bordens K. S. and Abbot B. B. Research design and methods: a process approach. Mountain View, CA: Mayfield Publishing Co., 1988.</li> <li>6. Mitchell M.L. and Jolley J. M. Research design explained, London: Holt, Rinehart and Winston, 1988.</li> <li>7. Weisberg H. and Bowen B. D. Introduction to survey research and data analysis. Glenview, IL: Scott, Foresman, 1989.</li> <li>8. Devore J.L., Farnum N.R. Applied Statistics for Engineers and Scientists, Duxbury Press; 2 edition, 2004.</li> <li>9. Coleman H.W., Steele G.W. Experimentation and Uncertainty Analysis for Engineers, Wiley-Interscience; 2 edition, 1999.</li> <li>10. Mason R.L., Gunst R.F. and Hess J.L. Statistical Design and Analysis of Experiments, with Applications to Engineering and Science, Wiley-Interscience; 2 edition, 2003.</li> </ol>
Course prerequisites	none

### Course outline

Theme	Hours
Planning scientific research	7
Design and planning of experiments, carrying out experiments	7
Uncertainty analysis	6
Visualisation of experimental data, data processing and analysis methods	6
Numerical and optimisation methods	6
Preparation of report	6
Preparation of scientific publications	6
Presentation of course work	4

### Learning outcomes and assessment

Learning outcomes	Assessment methods
Is able to plan scientific research process, plan and carry out experiment	Examination: practical work, course work, test Criteria: student plans scientific research and carries out experiment
Is able to process and analyse data	Examination: practical work, course work Criteria: student does statistical analysis of data

Is able to prepare scientific report and publications	Examination: practical work, course work, test Criteria: student prepares scientific report and publications
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***Study subject structure***

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	1.0	1.0	1.0	*		