OSE Scientific Computing for Economists

MA AM OSE

UNIVERSITÄT BONN

Content and learning outcome

Content	The sound analysis of computational economic models requires expertise in economics, statistics, numerical methods, and software engineering. The module provides first an overview of basic numerical methods for optimization, numerical integration, approximation methods, and uncertainty quantification. Then deepens the understanding of each of these topics in the context of a dynamic model of human capital accumulation using respy. Finally concludes by showcasing basic software engineering practices such as the design of a collaborative and reproducible development workflow, automated testing, and high-performance computing.
Learning outcome	Students learn how to use Python for advanced scientific computing. They acquire a toolkit of numerical methods frequently needed for the analysis of computational economic models, obtain an overview of basic software engineering tools such as GitHub and pytest, and are exposed to high-performance computing using multiprocessing and mpi4py.

Teaching and learning methods

Type of course/ learning methods	Topic	Language of instruction	Group size	Contact time	Workload [h]
Lecture	OSE Scientific Computing for Economists	English	30	4 hours	60
Self-study					165

Prerequisites

obligatory	none
recommended	

Degree program allocation

Study Program/Study Field/Module Number/Lecture Number	obligatory/ elective	Semester
Economics (M.Sc.)/Management & Applied Microeconomics, Econometrics & Statistics/332123029/332023029	elective	3rd
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Requirements for the awarding of credit points (ECTS)

		Credits
Prerequisites for participation	None	7,5 CP
Types of Assessment Examination language	Written or oral exam or term paper (graded, 100%) English	

Course Cycle

Course Cycle		Workload	Duration
Winter term ☒ Summer term ☐	Winter and Summer term ☐	225 h	1 Semester

Module coordination

Teaching person	See https://basis.uni-bonn.de
Module coordinator	Prof. Dr. Matthias Kräkel
Institute/Department	Department of Economics

Further Information

Literature	• **Ken Judd**. Numerical methods in economics. MIT University Press, Cambridge, MA, 2013.
	• **Hans Petter Langtangen.** A primer on scientific programming with Python. Springer, Heidelberg, Germany, 2016.

export into other study programs is only possible if contract between faculties exists