Select list of modules for the certificate “Science of Modeling, Simulation and Optimization”

Theoretical area

Name of the module/courses	Language	In charge of the course
Geometrische Grundlagen der Linearen Optimierung (lecture + tutorial + exercises) **10 LP**	dt	Prof. Dr. Michael Joswig
Einführung in die Multiskalenmodellierung (seminar) **5 LP**	dt	Prof. Dr. Andrea Mroginski
Funktionalanalysis I (lecture + tutorials + exercises) **10 LP**	dt/en	Prof. Dr. Gitta Kutyniok
Integraltransformationen und partielle Differentialgleichungen für Ingenieurwissenschaften (lecture + tutorial) **5 LP**	deutsch	Dr. Konstantin Fackeldey
Numerik II für Ingenieure (lecture + tutorial) **10 LP**	englisch	Prof. Dr. Jörg Liesen
Lineare Optimierung (ADM II) (lecture + tutorial + exercises) **10 LP**	dt	Prof. Dr. Michael Joswig
Machine learning 1 (lecture + practical work) **5 LP**	dt/en	Prof. Dr. Klaus-Robert Müller
Machine learning 2 (lecture + tutorial) **5 LP**	dt/en	Prof. Dr. Klaus-Robert Müller
Mathematical introduction to compressed sensing (lecture) **10 LP**	dt/en	Prof. Dr. Gitta Kutyniok
Nichtlineare Optimierung (lecture + tutorial) **10 LP**	dt	Prof. Dr. Dietmar Hömberg
Variationsrechnung und Optimalsteuerung (lecture) **5 LP**	dt	Prof. Dr. Fredi Tröltzsch
Numerik partieller Differentialgleichungen (lecture + tutorial) **10 LP**	dt/en	Prof. Dr. Reinhold Schneider
Numerik stochastischer partieller Differentialgleichungen (lecture) **10 LP**	dt/en	Dr. Raphael Kruse
Probabilistic and Bayesian Modelling in Machine Learning (seminar) **5 LP**	en	Prof. Dr. Manfred Opper
Uncertainty quantification of high dimensional partial differential equations (lecture) **10 LP**	dt/en	Prof. Dr. Reinhold Schneider

Application area

Name of the course	Language	In charge of the course
Modellierung und Simulation in der Lebensmitteltechnologie (lecture + tutorial) **5 LP**	dt/en	Prof. Dr. Cornelia Rauh
Modellierung und Simulation in Mensch-Maschine-Systemen (lecture + tutorial) **5 LP**	dt	Prof. Dr. Nele Rußwinkel
Modellierung und Simulation von Batterien (lecture + tutorial) **5 LP**	dt	Prof. Dr. Julia Kowal
Modellierung und Simulation von Verkehr (lecture + practical work) **5 LP**	dt	Prof. Dr. Kai Nagel
Turbulenzmodellierung (CFD4) (lecture + tutorial) **5 LP**	dt	Prof. Dr. Jörn Sesterhenn
Virtuelle Akustik (lecture + tutorial) **5 LP**	dt	Prof. Dr. Stefan Weinzierl
Hydrogeologische Projekte – Strömungs- und Stofftransportmodellierung im Boden und Grundwasser (lecture + tutorial + practical work) **5 LP**	dt	Prof. Dr. Irina Engelhardt
Integrierte Wasserversorgung - Geochemische Modellierung im System Boden- Wasser-Gestein (lecture + tutorial + practical work) **5 LP**	dt	Prof. Dr. Irina Engelhardt
Einführung in die Umweltmodellierung (lecture + practical work) **5 LP**	dt	Prof. Dr. Eva Paton
Vertiefung in die Umweltmodellierung (lecture + practical work) **5 LP**	dt/en	Prof. Dr. Eva Paton

Requirements for the Certificate “Science of Modeling, Simulation and Optimization”

1. 30 credit points must be achieved to pass the certificate successfully. A maximum of two credit points can be awarded for the visit of BIMoS Days (minimum of two). A bonus credit point can be given for active participation in discussions on BIMoS Days.
2. The final examinations of the individual lectures and courses must be passed successfully.
3. At least two courses of each area, theory and application must be taken.
4. Courses that have been already successfully covered in the field of "Science of Modeling, Simulation and Optimization" in the Master's degree can be taken into account. For this purpose, a written application must be submitted to the BIMoS office.

Certificate “Science of Modeling, Simulation and Optimization”

Name: _____

Address: _____

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E-Mail: _____

List of the successfully passed courses

Name of the course	Person in charge	Signature	Date

Please observe the notes on the back.

Technische Universität Berlin
Berlin International Graduate School in Model and Simulation based Research