

Module Name	Machine Learning in Information Technology
Module Number	Eul-ET-E-MLIT, Eul-IST-E-MLIT
Responsible Lecturer	Prof. Dr.-Ing. Rafael F. Schaefer rafael.schaefer@tu-dresden.de
Qualification Objectives	After completing the module, students are familiar with and understand specific concepts and algorithms of machine learning for applications in information and communication technology. They are able to design, train, and validate artificial neural networks for specific problems using current software.
Contents	The module covers the fundamentals, concepts, and applications of machine learning in information technology. This includes the application of machine learning approaches to the design and optimization of systems in information and communication technology, taking into account system-relevant design criteria such as reliability, robustness, and security. It also includes the information-theoretical analysis of the machine learning algorithms used, critical evaluation of the design process, and practical experience with current software libraries for designing and training artificial neural networks.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of exercises, and self-study. The language of instruction for lectures and exercises may be German or English and will be determined by the lecturer at the beginning of the semester and announced in the usual manner.
Prerequisites for Participation	Basic knowledge of linear algebra and calculus is required, which can be acquired in the modules "Introduction to Analysis and Algebra" and "Multidimensional Differential and Integral Calculus." Additionally, the competencies acquired in the module "Information Theory" are required. Basic programming skills, for example in Python, are also necessary.
Usability	The module is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 4 of the examination regulations of the main study program in the field of Information Technology in the diploma program Electrical Engineering. Furthermore, it is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 3 of the examination regulations of the main study program in the field of Communication Technology in the diploma program Information Systems Engineering. The module creates the prerequisites for the modules that list it under "Prerequisites for Participation."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a complex assessment with a workload of 50 hours.
Credit Points and Grades	5 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.