COMSOL Multiphysics

Charles University is the owner of the network academic license of the modular simulation software COMSOL Multiphysics. Employees, researchers and students can install the license both on computers owned by the university and on private computers connected to the university network. The number of installations and performance is not limited, the license is limited only by the number of purchased keys (= number of concurrently running licenses). You can use the license for academic purposes (final papers, public research projects, grant projects with public output), but not for contractual development (with companies, hospitals or government institutions).

About COMSOL Multiphysics

COMSOL Multiphysics is a dynamically evolving tool for numerical simulations of ordinary and partial differential equations. The COMSOL Multiphysics core allows you to conveniently insert and configure a template of a partial differential equation, model the geometry of a computational domain, add boundary and initial conditions, create a network and process simulation results. The extension to the COMSOL Multiphysics core is a physics-focused module covering a wide area of science and technology:

- low-frequency and high-frequency electromagnetism including wave and beam optics or plasma simulation,
- structural mechanics and dynamics including motion modeling,
- acoustics,
- flow of Newtonian and non-Newtonian fluids in different environments,
- heat transfer,
- chemistry and electrochemistry.

COMSOL also offers multi-purpose modules for quantifying model uncertainties, optimizing model parameters, trace particles in a current field, calculator of thermodynamic properties of fluid mixtures or expansion of a library of embedded material sheets. Last but not least, you can use the software for two-way interconnection with other MATLAB and Simulink science and technology software.

The advantage of COMSOL is intuitive control common to all types of tasks and the ability to simulate almost any multiphysical problems with different levels of coupling. Users also like COMSOL software for a high degree of transparency and customizability of models. The advantages for presentation and teaching purposes are the ability to program an application (PC, mobile phones, tablets) with its own GUI to the finished model. The Swedish-American COMSOL company offers COMSOL Server and COMSOL Compiler software in addition to COMSOL Multiphysics. The former can make user applications available via a web interface, the latter allows to compile the application into a self-executable program.

Products available for the University

The configuration and scope of the university license is described below. The COMSOL Multiphysics core is switched on each time the software is launched. It allows working with the model, including inserting marginal conditions. When the calculation is launched, in addition to the COMSOL Multiphysics core, it also locks concurrent accesses to all modules used. You can find out what modules the calculation consumes directly in the program in the "*File -> Licensed and Used Products in Session*" menu. If the software is busy, please inform the license manager, which is ales.houdek@ruk.cuni.cz .

- COMSOL Multiphysics – 5 concurrent access
- AC/DC Module – 1 concurrent access
- CAD Import Module – 1 concurrent access
- CFD Module – 1 concurrent access
- Heat Transfer Module – 1 concurrent access
- LiveLink for MATLAB – 1 concurrent access
- Material Library – 1 concurrent access
- Nonlinear Structural Materials Module – 1 concurrent access
- Optimization Module – 1 concurrent access
- Particle Tracing Module – 1 concurrent access
- RF Module – 1 concurrent access

- Structural Mechanics Modul – 1 concurrent access

How to obtain a license and install

COMSOL is a multi-platform software, you can download a version for Windows, Linux and MAC OS. Software and hardware requirements are specified by the manufacturer at www.comsol.com/system-requirements . **Warning**: The license server is only available from the university network. How to get the license for Windows:

1. Download the ISO-format installation DVD here .
2. After downloading "burn" ISO Image to the disk from which the installation will be performed.
   How to do this? In Windows 8 or later, you have the option to directly load ISO Image, right-click ISO Image and select Mount.
3. Once ISO Image is loaded from the disk, the installation program should start automatically. If not, run setup.exe in the folder from the mounted disk.
4. The installation program will guide you through the installation: select the language, select New COMSOL Installation, agree to the license agreement, and in the "*License information*" paragraph, select the licensing format "*<port number>*@*<hostname>*". After entering *Port number*: **1718** and *hostname*: **mlma.ruk.cuni.cz**, you can continue to the next installation window, where you will be asked to specify the configuration, among other things. It is recommended to install all relevant modules including documentation (see Products available for University). In the next installation window, you will be asked to refer to the MATLAB root installation folder, among other things. If you want to link COMSOL to MATLAB, you have the option. The next window offers an overview of all installed items, which is confirmed by pressing the "*Install*" button.
5. Once you are able to run COMSOL Multiphysics, you can register (using university email) in the COMSOL Access account https://www.comsol.com/access and upload the license file in the "Manage Licenses" section. This will assign a university license to your account and you can use technical support. Where to get the license file? You should find it in the installation folder (most often):
   C:\Program Files\COMSOL\COMSOL60\Multiphysics\license

For complete instructions on off-line and on-line installation under various operating systems, see the regularly maintained "*COMSOL Multiphysics® Installation Guide*" at www.comsol.com/documentation .

FAQ - Frequently Asked Questions

What to do if the license file doesn't work?

- You don't need the license file at all when installing the FNL client. In the setup program, you must always select the license format "<port number>@<hostname>".

What to do if the error message "Error: An error has occurred" appears during the installation. See the log file C:\Users..."?

- For a description of the problem and its solution, please see: https://www.comsol.com/support/knowledgebase/1083

What to do if I have encountered the error "Error: Licensed number of users"?

- The number of concurrent hits is probably exhausted at the moment. Please inform ales.houdek@ruk.cuni.cz or support@comsol.cz about the overload. If the error message persists for a long time, the solution could be described here: https://www.comsol.com/support/knowledgebase/1059

What to do if I have received the error message "Could not obtain license for COMSOL Multiphysics GUI"?

- Either the university license server (License Error -96) is not working and contact ales.houdek@ruk.cuni.cz or the computer is unable to connect to the license server, which may be due to several reasons listed here: https://www.comsol.com/support/knowledgebase/903

What to do if I have encountered a problem and want to try to solve it without technical support?

- You can try to find the solution in the maintained database: https://www.comsol.com/support/knowledgebase

What to do if I want to install COMSOL on Linux or MAC?

- Follow the instructions in the regularly maintained document www.comsol.com/documentation .

Technical support for the university license

- Technical support from HUMUSOFT (exclusive representative of COMSOL in the Czech Republic). Email: support@comsol.cz (on weekdays, usually a reply within 24 hours)
- International technical support available in the COMSOL Access account.
- University License Manager ales.houdek@ruk.cuni.cz

Don't overlook useful services for the university license

- **TRAINING** - Training for controlling the COMSOL Multiphysics software is organized at least twice a year by HUMUSOFT at reduced prices for academics: https://www.humusoft.cz/events/training/
- **PRIVATE SEMINARS** - HUMUSOFT offers the university to organize a seminar or workshop on a topic of interest to more people. If you are interested in this service, contact the technical support of the company.
- **CONSULTATION OF MODELS** - If you are interested in consulting a simulation model, do not hesitate to contact the technical support of HUMUSOFT.

- **E-LEARNING** - COMSOL also has its own e-learning center, which you can access. You can use it after logging in at https://www.comsol.com/learning-center
- **APPLICATION LIBRARY** - COMSOL has a library with more than 1500 correctly preset models and instructions for them. You can find them directly in the program in the menu *"File -> Application Libraries"* or on the page https://www.comsol.com/models
- **PAPERS AND RESEARCH** - COMSOL has a database of more than 5000 scientific articles and presentations published in the framework of international COMSOL conferences. This is an interesting source for creating searches available at https://www.comsol.com/papers-presentations .