Software setup

2105623 Optimization of Chemical Processes · Semester 1/2026

Deadline: bring a working laptop to the Week 2 session, Monday 17 August 2026. Week 2 is the first hands-on session. If your environment is not working you will spend that session watching a neighbour instead of building a model. Start today, not on Sunday night.

1. What you need, and when

From	Tool	Why
Week 1	Excel with Solver, or OpenSolver	Weeks 1 to 5 build models in a spreadsheet
Week 4	Python 3.10 or later, with Pyomo	The pooling problem cannot be done in a spreadsheet
Week 4	HiGHS *or* CBC *or* GLPK	Linear and integer models
Week 4	Ipopt	Nonlinear models

2. Excel: enable Solver

Windows. File → Options → Add-ins → Manage: Excel Add-ins → Go → tick **Solver Add-in** → OK. Solver then appears on the Data tab.

macOS. Tools → Excel Add-ins → tick **Solver** → OK.

OpenSolver (free, handles larger models than the built-in Solver, which stops at 200 variables): download from `opensolver.org` and open the `.xlam` file. On macOS you will be asked to approve the bundled CBC solver the first time you run it. Full instructions are in `OpenSolver_Setup_Guide.pdf` on myCourseVille.

3. Python and Pyomo

Install Miniforge or Anaconda first, then run these commands in a terminal.

```
conda create -n opt python=3.11
conda activate opt
conda install -c conda-forge pyomo numpy scipy pandas \
    matplotlib jupyterlab ipopt coin-or-cbc glpk
pip install highspy
```

If you prefer plain `pip` without conda, the modelling stack and HiGHS install cleanly:

```
pip install pyomo numpy scipy pandas matplotlib jupyterlab highspy
```

but Ipopt is much easier through conda-forge, and you will need it from Week 4.

4. Check that it works

Run this in a notebook or a Python file. Each solver you have installed prints `ok`.

```
import pyomo.environ as pyo

for name in ["appsi_highs", "glpk", "cbc", "ipopt"]:
```

```
    s = pyo.SolverFactory(name)
    ok = s is not None and s.available(False)
    print(name, "ok" if ok else "MISSING")
```

You need at least one of `appsi_highs`, `glpk` or `cbc` to say `ok`, and you need `ipopt` to say `ok` by Week 4.

5. Apple Silicon notes

HiGHS, CBC, GLPK, Ipopt and Gurobi all have native macOS arm64 builds, so the commands above work as written. Two cautions:

- Do **not** use `idaes get-extensions`. Those binaries target Intel and are not supported here. Use conda-forge.
- Bonmin and Couenne are optional. They are used only in confirmation cells that are marked optional in the notebooks, and no required result in any week depends on them. If conda-forge has no arm64 build for them, either skip them or create an Intel environment and run it under Rosetta 2:

```
CONDA_SUBDIR=osx-64 conda create -n opt-x64 python=3.11
conda activate opt-x64
conda config --env --set subdir osx-64
conda install -c conda-forge ipopt coin-or-cbc \
    coin-or-bonmin coin-or-couenne
```

6. If it does not work

Come to the clinic at the start of the Week 2 session, or email `soorathep.k@chula.ac.th` with the exact error message and your operating system. Do not spend three hours fighting an installer alone. An installation problem is not a reason to fall behind in this course, but an unreported one is.

Commercial solvers such as Gurobi and CPLEX may be used under an academic licence, but no assignment or examination in this course requires them. Every notebook detects whichever solver you have installed and falls back to an open-source one.