# FINAL EVALUATION FORM - MODELING AND APPLIED MATHEMATICS

*Note: Throughout this document, the masculine gender is used generically to refer to any person, regardless of their gender.*

**Student** : Last Name :..... First Name : .....

**Year - Spec : 4th year Applied Mathematics**

**Host Organization**: .....

**Internship Dates** : From..... to .....

**Professional Supervisor** : .....

Email : .....

Dept. / Position : .....

Phone :.....

**Academic Advisor :**..... Email : ..... Phone : .....

**Internship Subject** : .....


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This evaluation form is based on the **Competency-Based Approach**, a framework designed to assess the future engineer's ability to act effectively in professional situations. You will be asked to evaluate the student's proficiency level in ***Competencies***, defined as "a complex ability to act, drawing upon and combining various forms of knowledge, practical skills, and personal qualities to propose and implement a relevantand efficient solution to encountered situations within a given context". These competencies are structured within a framework known as the ***Competency Framework***. For the Modeling and Applied Mathematics degree programme at Polytech Lyon, this framework comprises **4 Competencies** representative of modeling and Applied Mathematics activities. This internship provides the student with the opportunity to develop and apply **one (or more) of these competencies**. The evaluation of each Competency hinges on two main axes: on one hand, its ***Key Components***, which are the specific criteria describing the quality of the expected action; and on the other hand, the ***Key Learnings***, which are necessary for the exercise of the Competency and involve mobilizing multidisciplinary resources of various kinds.

| Evaluation Levels for **Competencies** and their Key Components | |
|---|---|
| **Highly Capable** | The student demonstrates exceptional mastery of the competency. They act proactively and autonomously in all situations, including the most complex or unforeseen ones, by adapting theirapproaches. They optimally and justifiably mobilize and combine all adequate knowledge, skills, and attitudes, adhere to all rules and constraints, apply the expected methodologicalapproaches, communicate in an exemplary manner, and produce excellent quality results |
| **Capable** | The student demonstrates full mastery of the competency. They are capable of acting autonomously in given situations by mobilizing and combining adequate resources (knowledge, practicalskills, and attitudes). They adapt their actions, adhere to rules and constraints, utilize relevant methodological approaches, justify their choices, communicate effectively, and produce resultsthat meet expectations. |
| **Partially Capable** | The student is in the process of acquiring the competency. They act in given situations but encounter difficulties in fully and/or adequately mobilizing and combining the necessary knowledge, skills, and attitudes. Significant guidance is still required to adapt their actions to specific situations, adhere to all constraints, or to fully and effectively justify their choices. |
| **Not Capable** | The student does not master the competency. They are unable to act in given situations or to mobilize and combine the necessary knowledge, skills, and attitudes. Actions taken do not adhereto constraints, methodological approaches are inappropriate, communication is ineffective, and/or full assistance is required for any accomplishment. |

| Evaluation Levels for **Key Learnings** | |
|---|---|
| **Acquired** | The key learning is fully mastered. The student effectively and autonomously mobilizes all necessary knowledge, skills, and attitudes required to demonstrate the associated competency,including in diverse situations. |
| **In Progress** | The key learning is under development. The student is beginning to mobilize the necessary knowledge, skills, and attitudes but still requires significant guidance for full and effective applicationwithin the associated competency. |
| **Not Acquired** | The key learning has not been demonstrated. The student is unable to mobilize the necessary knowledge, skills, and attitudes to demonstrate the associated competency, or the related actionrequires full assistance |

***Important note**: in the following tables,* the **key learnings** marked in **grey** * *correspond to the 5th-year internship level. However, for this 4th-year internship, they may be included in the assessment if they were **significantly mobilized** within the scope of the assigned tasks.*

| ↓ *Check this box if the competency has been mobilized during the internship* | | **Supervisor Evaluation** | | | | **Student Self-Evaluation** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Competency **C1** : **DESIGN A SCIENTIFIC COMPUTING TOOL** | Highly Capable | Capable | Partially Capable | Not Capable | Highly Capable | Capable | Partially Capable | Not Capable |
| ↓ *Check the boxes corresponding to the key components mobilized during the internship* | | | | | | | | | |
| | … by taking into account sustainability and corporate social responsibility issues | | | | | | | | |
| | … by using tools and methods adapted to the client's functional needs | | | | | | | | |
| | … by developing a computational (hardware/software) solution that meets the client's needs | | | | | | | | |
| | … by applying collaborative working methods effectively | | | | | | | | |
| | … by alidating the quality, efficiency, and optimization of the proposed solution with appropriate numerical criteria | | | | | | | | |
| | … by documenting the solution clearly and thoroughly | | | | | | | | |
| | … by adapting communication to different stakeholders | | | | | | | | |

| ↓ *Check the boxes corresponding to the **key learnings** mobilized during the internship* | | Acquired | In Progress | Not Acquired | Acquired | In Progress | Not Acquired |
|---|---|---|---|---|---|---|---|
| | Manipulating files and content in UNIX-based operating systems | | | | | | |
| | Programming basic numerical analysis methods in imperative languages (C, Matlab), considering finite precision arithmetic and its impact on calculation conditioning | | | | | | |
| | Implementing verification techniques (manufactured solutions, observed convergence order, backward error analysis, static/dynamic analysis, unit tests) and code validation (statistical analysis) | | | | | | |
| | Using Git for collaborative development | | | | | | |
| | Modeling IT project specifications using UML | | | | | | |
| | Programming numerical analysis and data science methods in object-oriented languages (C++ / Python) using scientific libraries (STL, SAS, R, Scikit-Learn) | | | | | | |
| | Producing code documentation with tools such as Doxygen | | | | | | |
| | Translating data science prediction methods into computer algorithms | | | | | | |
| | Translating numerical discretization and solving methods into implemented algorithms | | | | | | |
| | Using modeling/simulation software (such as FreeFem++, COMSOL) for complex numerical simulation problems (fluid/solid mechanics, etc.) | | | | | | |
| | Using modeling/simulation software for complex data science problems (financial modeling, machine learning, classification) | | | | | | |

**Comments :**

| ↓ *Check this box if the competency has been mobilized during the internship* | | **Supervisor Evaluation** | | | | **Student Self-Evaluation** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Competency **C2** : **MODEL A DETERMINISTIC PROCESS** | Highly Capable | Capable | Partially Capable | Not Capable | Highly Capable | Capable | Partially Capable | Not Capable |
| ↓ *Check the boxes corresponding to the key components mobilized during the internship* | | | | | | | | | |
| | … by mobilizing advanced mathematical knowledge (analysis, linear algebra, optimization, differential equations) relevant to the domain | | | | | | | | |
| | … by integrating the socio-economic context of innovation or research (France or abroad) | | | | | | | | |
| | … by conducting a scientific approach adapted to the client's needs | | | | | | | | |
| | … by validating quality, efficiency, and optimization of the proposed solution with appropriate criteria | | | | | | | | |
| | … by communicating effectively throughout the project | | | | | | | | |
| | … by considering eco-design and CSR approaches | | | | | | | | |

| ↓ *Check the the boxes corresponding to the **key learnings** mobilized during the internship* | | Acquired | In Progress | Not Acquired | Acquired | In Progress | Not Acquired |
|---|---|---|---|---|---|---|---|
| | Implementing basic numerical methods for solving algebraic systems, polynomial interpolation, and numerical integration | | | | | | |
| | Applying numerical approximation methods for PDEs (such as finite differences) | | | | | | |
| | Solving complex engineering problems using advanced mathematical tools (measure theory, integral transforms, distributions) | | | | | | |
| | Programming constrained optimization algorithms (such as penalty, SQP) for solving KKT-constrained problems | | | | | | |
| | Addressing PDE problems (conservation laws, elliptic, parabolic, hyperbolic PDEs) | | | | | | |
| | Applying finite volume, finite element, or spectral methods for PDEs | | | | | | |
| | Conducting a theoretical and numerical analysis of PDE solver performance (mesh, conformity, numerical flux, stability, approximation error …) | | | | | | |
| | Conducting numerical simulation of a problem with numerical software such as COMSOL Multiphysics, FreeFem, etc. | | | | | | |
| | Editing and commenting a performance evaluation report for numerical software | | | | | | |

**Comments :**

| ↓ *Check this box if the competency has been mobilized during the internship* | | **Supervisor Evaluation** | | | | **Student Self-Evaluation** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Competency **C3**: **CHARACTERIZE DATA USING STATISTICAL & PROBABILISTIC METHODS** | Highly Capable | Capable | Partially Capable | Not Capable | Highly Capable | Capable | Partially Capable | Not Capable |
| | ↓ *Check the boxes corresponding to the key components mobilized during the internship* | | | | | | | | |
| | … by mobilizing advanced mathematical knowledge (probabilities, statistics, programming) | | | | | | | | |
| | … by integrating socio-economic innovation/research context | | | | | | | | |
| | … by conducting a scientific approach adapted to the client's needs | | | | | | | | |
| | … by analyzing available information (statistical units, variables, samples, populations, missing data) to choose an appropriate model | | | | | | | | |
| | … by using appropriate statistical methods (numerical and graphical indicators) | | | | | | | | |
| | … by presenting statistical studies clearly and concisely, orally and in writing, to specialists and non-specialists | | | | | | | | |

| ↓ *Check the boxes corresponding to the **key learnings** mobilized during the internship* | | Acquired | In Progress | Not Acquired | Acquired | In Progress | Not Acquired |
|---|---|---|---|---|---|---|---|
| | Modeling parameters associated with a variable of interest | | | | | | |
| | Conducting simple simulation with Python or R | | | | | | |
| | Editing R scripts to generate, analyze, and visualize data | | | | | | |
| | Estimating parameters and constructing confidence intervals | | | | | | |
| | Formulating and testing statistical hypotheses | | | | | | |
| | Estimating regression models using R, Python, SAS * | | | | | | |
| | Constructing simple Bayesian models and interpreting post distributions * | | | | | | |
| | Comparing Bayesian and frequentist approaches* | | | | | | |
| | Forecasting using time series models (ARIMA…) * | | | | | | |
| | Editing a diag of model validity (time series, ANOVA,…) regarding the residuals, VIF, collinearity, AIC/BIC…) * | | | | | | |

**Comments :**

| ↓ *Check this box if the competency has been mobilized during the internship* | | **Supervisor Evaluation** | | | | **Student Self-Evaluation** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Competency **C4** : **ANALYZE DATA FOR PREDICTION & DECISION SUPPORT** | Highly Capable | Capable | Partially Capable | Not Capable | Highly Capable | Capable | Partially Capable | Not Capable |
| ↓ *Check the boxes corresponding to the key components mobilized during the internship* | | | | | | | | | |
| | … by extracting key information from raw and complex dataEn extrayant des informations | | | | | | | | |
| | … by addressing concrete business problems | | | | | | | | |
| | … by generating relevant recommendations through data visualization | | | | | | | | |
| | … by developing appropriate machine learning algorithms | | | | | | | | |
| | … by communicating results clearly to varied audiences | | | | | | | | |
| | … by considering economic, ethical, and societal aspects | | | | | | | | |

| ↓ *Check the boxes corresponding to **the key learnings** mobilized during the internship* | | Acquired | In Progress | Not Acquired | Acquired | In Progress | Not Acquired |
|---|---|---|---|---|---|---|---|
| | Preparing datasets for analysis | | | | | | |
| | Coding automated data analysis scripts (Python, R, SQL, SAS…) | | | | | | |
| | Applying dimensionality reduction methods (PCA, sparse PCA, kernel methods) | | | | | | |
| | Choosing an appropriate neural network architecture (dense, convolutional…) | | | | | | |
| | Building and training neural networks (Keras, PyTorch) and evaluating performance (accuracy, error, ROC curve) | | | | | | |
| | Producing automated statistical reports | | | | | | |
| | Choosing suitable classification algorithms (SVM, logistic regression, K-means…) * | | | | | | |
| | Using optimization algorithms in high-dimensional spaces (stochastic gradient descent…) * | | | | | | |

**Comments :**

| Professional Attitude and Soft Skills | Satisfactory | Needs Improvement | Comments |
|---|---|---|---|
| **Integration and Collaboration –** Integration into the team, understanding and embracingthe culture and practices of the host organization, contribution to collective goals | | | |
| **Autonomy and Proactivity –** Effective work organization, taking appropriate initiatives,independently seeking information or solutions | | | |
| **Diligence and Reliability –** Punctuality, attendance, adherence to instructions anddeadlines, quality of work delivered within their scope | | | |
| **Communication and Interpersonal Skills –** Clarity of expression (written and oral), activelistening, adapting communication style to different audiences, politeness and courtesy | | | |

| Overall Evaluation | | |
|---|---|---|
| | **A – Exceptional** | Performance significantly exceeding expectations. Near-total autonomy, proactivity, and high-impact initiatives. Outstanding potential. |
| | **B – Very satisfactory** | Solid and fully satisfactory performance. Effectiveness, good autonomy, and relevant initiatives. |
| | **C – Satisfactory** | Performance meeting expectations for this level. Correct work, adequate autonomy, measurable progress. |
| | **D – Acceptable** | Acceptable performance overall, but requiring more supervision. Autonomy to be developed. |
| | **E – Passable** | Barely sufficient performance. Tasks completed with difficulty or requiring close supervision. Low autonomy. |
| | **F – Insufficient** | Clearly insufficient performance. Major difficulties in completing assignments or applying skills, significant deficiencies in know-how or soft skills. |

**Comment** (Mandatory for **A** to **F** rating) :

In view of this internship, would you consider recruiting this student once they graduate, should an opportunity arise? ☐ YES ☐ NO

Commentaires :

What advice would you give to the student?

Any additional observations? Are there any other relevant competencies or key learnings that you cannot find in this learning framework?

| **Date** : | **Professional Supervisor's signature** : | **Stamp of the host organization:** | **Please return this form to entreprise@polytech-lyon.fr at least 1 week before the defense** |
|---|---|---|---|