Master diploma in Operational Research Optimisation (RO)

UNIVERSITÉ TOULOUSE III PAUL SABATIER

Caracteristics

Geographic location(s)
Université Toulouse III - Paul Sabatier
Campus de Rangueil

Type of training
> Initial training
> Apprenticeship
> Continuing education
> VAE

Level of education
Master

Accessible in
> Face-to-face teaching

Distinction
Mathématiques et Applications

Partner Institutions
> Co-accréditation with ENAC, INSA and ISAE-SUPAERO

Contacts
Responsible teacher :

M1
Edouard Pauwels
edouard.pauwels@irit.fr
Thomas Pellegrini
thomas.pellegrini@irit.fr

M2
MANCEL Catherine
catherine.mancel@enac.fr

Accommodation capacity

Terms of access
> Master diplomas are open to candates owning a first cycle degree (180 ECTS) or equivalent in a corresponding domain.
> Admission is decided after a selection and based on the capacity of the diplomas as defined by the university.
> Depot of applications must be done through le site e-candidat (see Candidater).

Presentation
OR is a scientific discipline at the interface of Applied Mathematics, Computer Science and Engineering. In OR, we first seek to model the complex systems increasingly present in industry and in large organizations so as to, then, design decision support tools for the improvement of these systems. Often the real problems thus modeled bring into play optimization sub-problems.

To meet a significant regional demand from manufacturers (in particular from the aeronautics sector) and from academic research, the Toulouse RO course was created in 2012 under the M2R-IT specialty of the Computer Science section. This course has seen strong growth in the number of students: 4, 14, 20 then nearly 30 students at the start of 2015 and 2016, two-thirds of co-accredited schools; for the other third, those enrolled at UT3, the majority of students come from French-speaking Africa; otherwise other French or European establishments.
This course will allow the student to acquire solid skills in mathematical modeling, optimization, algorithms and computer implementation, which the researcher and engineer specializing in OR need.

Prospects and professional integration
Opportunities as an R&D engineer in many fields of application: transport, energy, production, logistics, telecommunications, media, manufacturing industry, construction, consulting companies, software publishers, life sciences, finance, etc.
Opportunity to continue with a doctoral thesis, a diploma increasingly valued abroad and in large French multinationals. There are also many funding possibilities for doing a thesis in France in an industrial environment (called CIFRE thesis) during which the student is hired as an engineer by the company.

Knowledge
> Mathematical modeling
> Complexity
> Graph theory
> Numerical optimization
> Combinatorial optimization
> Global optimization
> Meta-heuristics
> Mixed optimization with integer variables
> Optimization under uncertainty
> Constraint programming
> Applications in industry and services and in air transport in particular

Skills
At the end of this training, the student will be able to :
> Formulate, analyze and model real problems
> Recognize what broad category of optimization problems they belong to
> Estimate the complexity of an optimization problem
> To argue about the choices of modeling or optimization approaches
> Propose optimization or decision support methods adapted to the context
> Implement resolution algorithms
> Conduct digital testing campaigns
> Analyze feedback with a view to adjusting the model

Program
Web site : https://departement-math.univ-tlse3.fr/titulaire-d-une-licence