



SPECIALIZED MASTER®

NON DESTRUCTIVE TESTING

issued by INSA Lyon

NON DESTRUCTIVE



contrôle ultrasonore - courants de Foucault - fouille de données (data mining)
simulation - traitement d'images/signal - problèmes inverses - fouille de données (data mining)
visuel-vidéo-endoscopie - thermographie infrarouge et ressuage - simulation - probabilité de détection (POD) - magnétoscopie - contrôle par examen
traitement d'images/signal - problèmes inverses - fouille de données (data mining)
imagerie par rayons X - contrôle ultrasonore - émission acoustique - courants de Foucault
simulation - traitement d'images/signal - problèmes inverses - fouille de données (data mining)
visuel-vidéo-endoscopie - thermographie infrarouge et ressuage - simulation - probabilité de détection (POD) - magnétoscopie - contrôle par examen
ressuage - simulation - probabilité de détection (POD) - magnétoscopie - contrôle par examen

WHY CHOOSE SPECIALIZED TRAINING IN NDT?

Non-Destructive Testing (NDT) is found at all levels of our socio-economic system to guarantee the quality and reliability of products and structures, or simply to meet societal needs involving, for example, security or the environment. However, NDT training at the engineer or equivalent level is extremely rare and most practising experts in NDT learned the job in the field. This Specialized Master[®], is a high-level scientific training programme that trains professionals in NDT careers in all fields and industrial sectors in which NDT is used:

- Aeronautics and aerospace
- Energy (nuclear, petroleum, hydraulic and wind industries)
- Transport and infrastructure (road, rail, maritime, civil engineering)
- Safety and security (civil security, defence, food safety)
- Steel industry
- Construction and manufacturing industries (steel/wood/concrete)
- Chemical and petrochemical industry
- Environment and recycling
- Arts and heritage, etc.

SKILLS ACQUIRED

This training programme enables participants to acquire the skills necessary to implement traditional and advanced methods of NDT, make decisions, and validate technical choices.

It will offer knowledge about the possibilities of these techniques, their advantages and disadvantages, and their limitations and constraints depending on the environmental context.

It will enable students to integrate technical and technological developments in primary methods, as well as tools for analysing and processing digital data derived from NDT techniques, into their activities.

Graduates will be able to manage a team of technicians and engineers, and manage all aspects of an NDT operation, including economic, organisational and human aspects, while taking into account safety and risk prevention.

PATHS TO ADMISSION

Candidates do not need prerequisites in NDT. However, they must have a sound scientific background and a minimum level of English (level B1).

Target groups

- Recent graduates who would like to specialise in NDT
- Practising managers or engineers who would like to move into the NDT field
- NDT technicians who would like to develop within their companies

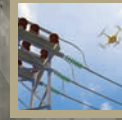
Required education/professional experience

This training programme is for:

- Graduates of engineering schools or scientific and/or technical universities (2nd year of a graduate Master's degree)
- Business managers with degrees: Those with a 4-year Bachelor's degree or Master's degree and at least 3 years of professional experience
- Those with a 2- to 3-year Bachelor's degree and at least 3 years of professional experience validated by an APL (Accreditation of Prior Learning organized by INSA)
- Foreign students with a Master's degree (or a level equivalent to 5 years of higher education) with an excellent mastery of the French language



VE TESTING



(data mining)
ement d'images/signal - problèmes inverses
es (data fusion - imagerie par rayons X
a mining)

GENERAL PRESENTATION

- Teaching is divided into 5 modules corresponding to 45 ECTS credits and a seminar module enabling students to learn about NDT needs in different activity fields.
- Around 450 hours of lectures, practical training and seminars from October to February
- In-company assignment from February to July: this assignment, in the form of an internship, may take place in France or, under certain conditions, abroad. It lasts between 18 and 26 weeks and includes the drafting of a professional report

PROGRAMME

Module 1: Know and practice the eight most common NDT techniques: X-ray imaging, ultrasonic testing, acoustic emission testing, eddy currents, magnetoscopic testing, visual-video-endoscope inspection, thermal imaging, and dye penetrant techniques.

Module 2: Know the materials, their production processes, in-service damage processes and defects that may occur in a component or structure. Be able to identify and choose the technique or techniques that can be used to respond scientifically to a particular issue.

Module 3: Know the main support tools for implementing NDT methods, for analysing and processing data (analogue or digital) provided by the different techniques: simulation, image/signal processing, inverse problems, data mining, probability of detection (POD) and data fusion.

Module 4: Learn about advanced inspection techniques (X-ray tomography, multi-element systems, etc.) and particular work environments: difficult access to works of art or high-voltage cables, for example, for inspection by drones or even heavily robotised factories (industry 4.0).

Module 5: Be capable of directing and managing an NDT operation while integrating economic, organisational, compliance, human, and security/risk prevention aspects in a national or international context.

Module 6: Learn about NDT through a series of 6 seminars describing particular applications while highlighting issues inherent to this field.

ADVANTAGES OF THE TRAINING

- Teaching mainly consists of practical work (over 25% of the total number of hours) performed on INSA's NDT platform or on industrial instruments
- The training programme calls upon many outside professionals (over 25% of the total number of hours), who are recognised experts in their fields
- Some teaching takes place in "project" mode to reinforce the students' abilities to work in their future environment

PARTNERS

The Specialized Master® in NDT is supported by COFREND, Confédération Française pour les Essais Non Destructifs, an interprofessional and multisectoral organisation that brings professionals together, and the national NDT Certification body according to the ISO/IEC 17024 standard.

It also receives support from EDF, St-Gobain, GE Measurement & Control, Intercontrôle/Framatome, VINCI Energies and the CEA (French Commission on Atomic Energy and Alternative Energies).

The training programme will be provided in close collaboration with INSAVALOR whose expertise in continuing education and NDT skills have been recognised at a national level for many years.

PROFESSIONAL PERSPECTIVES

The Specialized Master® in Non-Destructive Testing (NDT) aims to train high-level scientific professionals, managers and decision-makers on NDT techniques.

Future graduates will be able to practice their skills in many fields, in large industrial conglomerates, in SME's or in service and consulting companies.



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