



## Strategy for NDT education at universities in UK: An integrated education programme for NDT professionals

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**Abstract:** Some years ago, we at the British Institute of Non-Destructive Testing (BINDT) began work

on a programme to integrate vocational qualification – for example certification that results from our highly successful PCN scheme – within the broader context of education and professional development. The aim was to create a programme that:

- results in academic qualifications and engineering registration
- improves the status of certificate holders
- provides pathways for career development, including entry opportunities for school-leavers
- and also includes educational material - or links to access educational material.

It is certainly the case in the UK that NDT has traditionally suffered from the fact that the subject is not very well known in its own right – even within the professional engineering community. It is not a mainstream discipline. Certification is a vocational qualification and is not regarded in the same class as a degree – and of course there are fundamental differences, for example a degree is for life, whereas a certificate is usually temporary and has an expiry date. Very often there is no structured career development for NDT technicians... and no entry route for school leavers. In addition, it is a common challenge that there are insufficient new people coming into NDT. The overall result is a series of curricula, including degree courses and apprenticeship schemes, that provide an integrated education programme for NDT professionals.



# An integrated education programme for NDT professionals

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With acknowledgement to The University of Northampton, UK



# Outline

BINDT has embarked on a programme to integrate certification within the wider context of education and professional development ...

- Leading to academic awards and engineer registration
- Raising the status of certificated personnel
- Providing improved career development pathways, including entry opportunities for school leavers
- Including educational material (or links to it).



# Background

- NDT is not always perceived as a 'proper' engineering discipline
- NDT certification is not fully recognised in the wider professional community
- Certification does not confer professional status and is a temporary qualification
- There is no structured career development for NDT technicians
- The demographic issue – not enough new entrants into NDT
- There is no structured entry route for school leavers



# An integrated education programme for NDT professionals

- The Institute has established a programme for NDT professional development which incorporates vocational training, work-based learning, personnel certification, academic awards, professional engineer registration and ongoing learning provision
- It includes education and training within schools, colleges, universities, training bodies, Institute Branches, online and in the workplace.



# Key elements of the programme

- distance learning options
- recognition of certification within an academic programme
- work-based learning
- school leaver entry level
- mature entry level for certificated personnel
- links with professional engineer registration



# NDT Professional Development Qualification Matrix

Work based	Vocational	Academic	Professional	QCF equivalent
Apprenticeships CPD Experiential Learning		Engineering Doctorate		8
		Masters degree	Chartered Engineer	7
		BSc NDT	Incorporated Engineer	6
	PCN 3	FdScNDT Stage 2		5
				4
	PCN 2 PCN 1	FdScNDT Stage 1	Engineering Technician	3
SCHOOL LEAVER OR OTHER ENTRY LEVEL				



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# Apprenticeships

## *Deliverables:*

- NDT Operator
- NDT Engineering Technician
- NDT Engineer

➤ End-point assessments





# The Foundation Degree in NDT

- Started in July 2007
- Delivered through a combination of work-based and distance learning
- Majority of students are existing NDT personnel
- NDT certification gives exemption from some modules
- Combined work-based, class-room and distance learning programme
- A clear, comprehensive and flexible structure for education and training for **anyone** wishing to embark on a career in NDT.



# Foundation degree in NDT - content

Stage 1 comprises:

▪ Introduction to NDT	20
▪ Material Properties	20
▪ Electronic Principles	20
▪ Mathematics for Technology Part 1	20
▪ Technical Project	20
▪ Personal Development	20

Total Credit Points = 120



# Foundation degree in NDT - content

Stage 2 comprises:

- |                                       |    |
|---------------------------------------|----|
| ▪ Visual and Surface Testing          | 20 |
| ▪ Radiographic Testing                | 20 |
| ▪ Ultrasonic Testing                  | 20 |
| ▪ Eddy Current Testing                | 20 |
| ▪ Quality Management of NDT           | 20 |
| ▪ Quality Tools and Techniques in NDT | 20 |

Total Credit Points = 120



# Progression to BSc (Hons) NDT

Successful completion of the FdScNDT

OR

PCN Level 3 in four relevant methods



# BSc (Hons)NDT top-up content

- Corrosion Analysis 20
- Thermographic Imaging 20
- Vibration Monitoring and Analysis 20
- Advanced Inspection Methods and Techniques 20
- Technology Project 40

Total Credit Points = 120



# Benefits

Paid employment while studying (no debt from tuition fees)

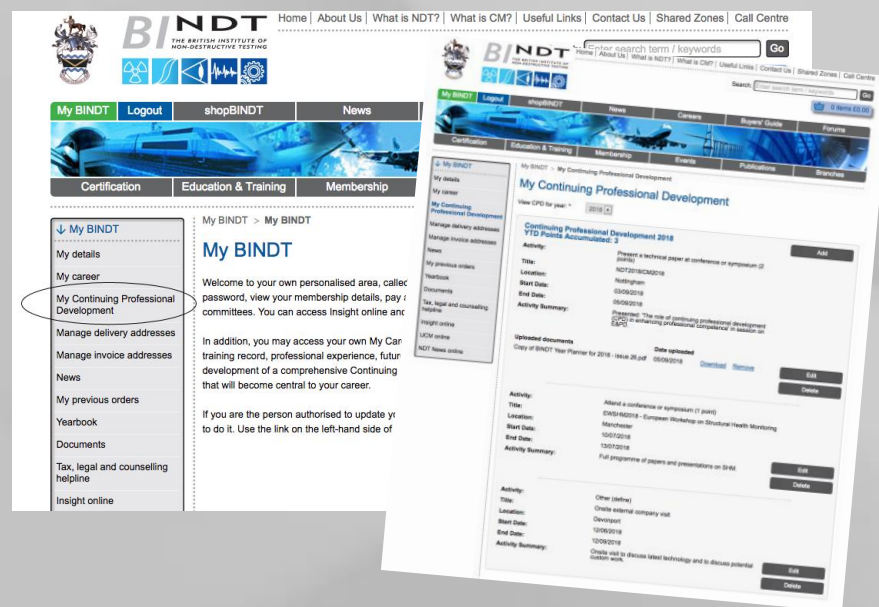
- Academic qualifications
- Vocational qualifications e.g. PCN
- Professional engineer registration
- Work experience
- Wide range of job opportunities
- A successful student embarking on the programme at age 18 could have achieved the following after 4 years:
  - A Foundation Degree in Non-Destructive Testing
  - PCN certification at levels 2 and 3
  - Engineering Technician Registration
- Opens pathway to further progression



# Continuing Professional Development

New comprehensive programme

- On-line delivery
- Individual web-space for members to log CPD and work experience
- Link with professional registration requirements – EngTech, IEng and CEng
- Link with PCN certification renewal requirements



# The future

- The successful shift to NDE 4.0 will require developing and adopting new ways of working
- Industry 4.0 will dramatically improve the productivity of service technicians in the field by enabling technology-assisted predictive maintenance
- We will see more and more manufacturing environments that are smart and autonomous in a way that they will be able to analyse their own state and the environment and adapt autonomously according to their analysis. In order to design and implement such systems, students must be competent in methods of artificial intelligence and machine learning.





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	NDT/NDE Engineer?	BSc (Hons) NDT	Incorporated Engineer	6
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# Conclusions

- The British Institute of NDT is making good progress with its education and professional development programme
- Plans for the future recognise industry's need for integrated inspection and test provision
- Education materials being developed for schools (outreach programme)
- Developing high-quality and relevant material for continuing professional development will help ensure NDT professionals remain at the forefront
- Recognising the overlaps in academic and vocational training leads to possibilities of mutual recognition and exemption pathways
- Professional recognition enhanced
- New career pathways being opened up.



# *Thank you for listening*

[www.bindt.org](http://www.bindt.org)

[www.northampton.ac.uk](http://www.northampton.ac.uk)

