

University of Newcastle, UK - Pipeline Engineering, MSc

INTRODUCTION

The University of Newcastle in the UK offers a full time (12 months) Master of Science Degree in Pipeline Engineering. The course will soon include a part time option (36 months part time) and distant learning modules.

This Masters programme aims to produce graduates who have developed a well-founded knowledge and understanding in pipeline engineering, so that they are regarded as being competent to practise as pipeline engineers by prospective employers. It is tailored to meet the specific requirements of the oil and gas industry, covering all aspects of high-pressure onshore and offshore pipelines.

Students take 11 compulsory modules, worth 120 credits in total, culminating in the submission of a dissertation worth 60 credits. The 11 modules are: fundamentals of pipeline engineering; materials and fabrication; corrosion and corrosion control; civil and geotechnical aspects of pipeline engineering; pipeline structural analysis; safety, risk and environmental management; dynamics of offshore installations; hydrocarbon production and process engineering; design and construction; asset management; economics for engineers.

THE COURSE

Responding to the need to equip the next generation of pipelines with appropriate qualifications, the University of Newcastle is offering a Masters' degree in pipeline engineering. The course is tailored to meet the specific requirements of the oil and gas sector, covering both high-pressure offshore and onshore pipelines. A modular, integrated multidisciplinary course is adopted, covering all key aspects between the well-head and the customer boundary fence.



Course Organisation

A unique feature of the course is the high level of participation by industry in specifying the curriculum. Pipeline engineering companies provide visiting lecturers; they represent a broad cross-section of the pipeline industry and include leading-edge, world-class players. The university is in the north east of England, which is a major centre for pipeline engineering, being home to some 35 companies. This enables leading technical specialists from industry to work closely with university staff and to undertake extensive lecturing and student mentoring duties. Visits are organised to local company facilities, operating installations and to construction sites.

The course utilises the Chemical and Process Engineering, Civil, Marine Technology and the Mechanical, Materials and Manufacturing departments in the Faculty of Engineering, plus support from the School of Management. All these departments at the University of Newcastle enjoy a high Funding Council rating for research capability. Residential versions of the course require either twelve month's full-time study, or by part-time attendance over 36-months. A distance learning option is also being developed.

The course will thus appeal to both newly-qualified, first-degree graduates who wish to enter the pipeline industry, and to those already in employment requiring relevant specialist knowledge or for their continuing professional development. The course qualifies as a 'matching section' required by the U.K. Engineering Council for a Chartered Engineer qualification.

THE COURSE MODULES

Fundamentals of Pipeline Engineering (15 credits)

Introduction to: history of pipelines and their role in the hydrocarbon chain; structure of the pipeline industry; contract and project management concepts; pipeline design and operating codes; environmental and safety legislation; system operation, control and management; professional responsibilities of the pipeline engineer.



Design and Construction (10 credits)

Offshore and onshore pipeline design codes; sub-sea pipeline concepts and construction details; pipeline route evaluation; construction and installation practice; proof and hydro-testing; commissioning operations; procurement and quality assurance practice; project management techniques.



Asset Management (10 credits)

Network modelling and system control; hydro-testing, cleaning and intelligent pigging; in-service inspection and whole life assessment strategies; maintenance of associated above-ground plant; repair and rehabilitation methods.



Economics for Pipeline Engineers (10 credits)

Accountancy and financial management principles; relationship between design specification and construction, operating and maintenance costs; project and investment appraisal techniques; taxation and regulatory issues.

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Hydrocarbon Processing and Production (10 credits)

Well fluid specification; physical, thermodynamic and flow properties of hydrocarbons; liquid, gas and multi-phase flow phenomena; chemical treatments for flow modification; wax and hydrate suppression; acid and inert gas removal; dew point control; flow through fittings; pump and compressor performance; effect of well fluid treatments on pipeline design and operation.

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Corrosion and Corrosion Control (10 credits)

Electro-chemical theory of corrosion; internal corrosion (sweet, sour, erosion-corrosion and microbiological attack); external corrosion (pitting and general corrosion, hydrogen effects and stress corrosion cracking); internal corrosion control (fluid chemistry and corrosivity assessment, chemical treatment and inhibitor performance, coatings and linings, in-service monitoring); external corrosion control (coatings, cathodic protection and above-ground survey practices).

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Materials and Fabrication (10 credits)

Influence of manufacturing processes on the chemical composition, metallurgical and physical properties of steel linepipe and fittings; manufacturing specifications and quality control; welding processes and weld properties; non-destructive inspection of welds and welding qualification procedures; mechanical joining systems for non-metallic, composite and flexible linepipe.

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Dynamics of Offshore Installations (10 credits)

Wave theories; wind, wave and current force prediction; vortex-induced vibrations; natural frequency and modal response prediction; hydro-elastic response analysis; influence of floating installation motions on riser behaviour.

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Pipeline Structural Integrity (15 credits)

Wall thickness and material grade selection; limit-state and reliability-based design; fatigue analysis; crack propagation phenomena; behaviour of manufacturing defects and in-service damage; fitness-for-purpose assessments of defects and damage; stress analysis of fittings; ground movement and thermally-induced buckling; fluid loading effects on risers.



Civil and Geo-technical Engineering (10 credits)

Nature and origin of soils and seabed formations and their structural properties; soil mechanics principles; ground stability assessment and improvement techniques; pipeline loading from pipe-soil interaction; seabed geo-technics.



Safety and Environmental Engineering (10 credits)

Pipeline failure modes and statistics; major hazard identification; characteristics of hydrocarbon explosions and fires; risk analysis and assessment techniques; safety and environmental management practice; legislation and regulations.

FURTHER DETAILS

Visit <http://www.ncl.ac.uk/pipe.eng> or
telephone Dorothy Potts at the University 44 (0) 191 222 6718.