The HNC Program

Corporate Learning Consultants Ltd. along with the Teesside University is providing one of the largest portfolios of accredited open learning programmes, serving the engineering and process industries, worldwide.

In-company HNCs

An HNC is a Higher National Certificate in a particular discipline validated by an accrediting body in this case Edexcel through the University of Teesside.

The HNC programmes provide a solid foundation by helping individuals gaining technical skills.
CLC shall create an In-company group so the dispersed people can get support from each other through internal networking.
There shall also be an administrator assigned to ensure the smooth running of the in-company group.

CLC offers the following HNCs by open learning:

- **Electrical & Electronic Engineering**
- **Mechanical Engineering**
- **Instrumentation & Control Engineering**
- **Chemical Engineering**

How do I start?

The normal entry route to an HNC is via an Ordinary National Certificate in an appropriate discipline. Alternative qualifications and industrial experience can also be taken into consideration. If you do not meet the entry requirements you can study one or more bridging modules to bring you up to the required standard.

How long will it take?

You can start a module at any time and progress at your own pace. Your tutor, however, will suggest guidelines to help you manage your time most effectively.

If the guidelines are followed you should achieve an HNC within 2 – 3 years, assuming 6 – 8 hours study per week. Please refer to the Personal Learning Plan for more details.

NOTE: You have 5 years to complete your HNC from the date of registration.

What support will I receive?

Tutorial support is a necessary part of our programmes as it is via this process that your work is assessed. Assessment and support can be provided directly from CLC. (Some other centres also offer support for these courses.)

Contact with your tutor can be made by:

- personal visit
- telephone
- fax
- e-mail
- post
- web cam

How will I be assessed?

There are no examinations on the HNC courses. You will be assessed by completing Tutor Marked Assignments [TMAs] for each module. Your tutor will mark your assignments and provide feedback. If you fail an assignment you will be asked to re-submit.

Some modules also have practical assessments. Please check that your chosen support centre has the necessary practical facilities before starting these modules.

To ensure that the work you have submitted is your own, the final assessment for each module is in the form of an interview with your tutor. Such interviews will normally take place at your support centre or by telephone or web-cam (with suitable precautions).

Costs:

Each module is priced at £350 along with a one-off registration fee of £175. All materials support and tuition costs are included.

Contact us for more information.

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University of Teesside Edexcel HNC Programmes*

HNC in Electrical & Electronic Engineering

CORE MODULES

Analytical Methods for Engineers
Business Management Techniques
Electrical and Electronic Principles
Engineering Science
Project

OPTION MODULES (any 5)

Applications of Pneumatics & Hydraulics
Combinational & Sequential Logic
Control Systems & Automation
Digital & Analogue Devices and Circuits
Electrical Plant Protection
Electrical Power
Electrical Supply & Distribution Systems
Electricity & Lighting
Electronics
Engineering Design
Heavy Current Applications
Microprocessor Systems
Operational Amplifiers
Power Electronics
Programmable Logic Controllers
Safety Engineering
Software
Utilisation of Electrical Energy

HNC Mechanical Engineering

CORE MODULES

Analytical Methods for Engineers
Business Management Techniques
Engineering Science
Mechanical Principles
Project

OPTION MODULES (any 5)

Applications of Pneumatics & Hydraulics
Electrical Power
Engineering Design
Engineering Thermodynamics
Fluid Mechanics
Heat Transfer & Combustion
Manufacturing Process
Materials Engineering
Mechatronic Systems Principles
Plant Maintenance & Management
Programmable Logic Controllers
Plant & Process Principles
Plant Technology
Safety Engineering

HNC Instrumentation & Control Engineering

CORE MODULES

Analytical Methods for Engineers
Business Management Techniques
Engineering Science
Instrumentation & Control Principles
Project

OPTION MODULES (any 5)

Analytical Instrumentation
Digital & Analogue Devices and Circuits
Electronics
Engineering Design
Microprocessor Systems
Operational Amplifiers
Programmable Logic Controllers
Plant & Process Control
Utilisation of Electrical Energy
Safety Engineering

HNC Chemical Engineering

CORE MODULES

Analytical Methods for Engineers
Business Management Techniques
Fluid Mechanics
Heat Transfer Science
Mass and Energy Balance
Materials Engineering
Mass Transfer Operations
Project

OPTION MODULES (any 2)

Analytical Instrumentation
Engineering Design
Process Control
Safety Engineering

The programmes are also shown overleaf in the form of a matrix.
Outline details of the content of each module are given in alphabetical order on the following pages.

***These programmes show all the modules that will eventually be available. Please contact us for current availability.**

HNC Module Matrix

	Module Title	Order No	E&E	MECH	I&C	CE
1	Analytical Instrumentation	292 6			OPT	OPT
2	Analytical Methods for Engineers	281 0	CORE	CORE	CORE	CORE
3	Applications of Pneumatics & Hydraulics	306 X	OPT	OPT		
4	Business Management Techniques	282 9	CORE	CORE	CORE	CORE
5	Combinational & Sequential Logic	307 8	OPT			
6	Control Systems & Automation	309 4	OPT			
7	Digital & Analogue Devices & Circuits	310 8	OPT		OPT	
8	Electrical & Electronic Principles	284 5	CORE			
9	Electrical Plant Protection	332 9	OPT			
10	Electrical Power	311 6	OPT	OPT		
11	Electrical Supply & Distribution Systems	331 0	OPT			
12	Electricity & Lighting	312 4	OPT			
13	Electronics	313 2	OPT	OPT	OPT	
14	Engineering Design	283 7	OPT	CORE	OPT	OPT
15	Engineering Science	279 9	CORE	OPT	CORE	
16	Engineering Thermodynamics	314 0		OPT		CORE
17	Fluid Mechanics	287 X		OPT		
18	Heat Transfer & Combustion	315 9				CORE
19	Heat Transfer Science	288 8				
20	Heavy Current Applications	316 7	OPT			
21	Instrumentation & Control Principles	286 1		OPT	CORE	
22	Manufacturing Process	317 5				CORE
23	Mass & Energy Balance	289 6		OPT		CORE
24	Mass Transfer Operations	290 X				CORE
25	Materials Engineering	291 8				
26	Mechanical Principles	285 3		OPT		
27	Mechatronic Systems Principles	318 3		OPT		
28	Microprocessor Systems	319 1	OPT	OPT	OPT	
29	Operational Amplifiers	320 5	OPT		OPT	
30	Plant & Process Control	321 3			OPT	
31	Plant & Process Principles	322 1				
32	Plant Maintenance & Management	323 X				
33	Plant Technology	324 8		OPT		
34	Power Electronics	325 6	OPT	CORE		OPT
35	Process Control	326 4		OPT		
36	Programmable Logic Controllers	327 2	OPT		OPT	CORE
37	Project	280 2	CORE		CORE	OPT
38	Safety Engineering	330 2	OPT		OPT	
39	Software	328 0	OPT			
40	Utilisation of Electrical Energy	329 9	OPT		OPT	

Business Management Techniques

◊ Costing systems and techniques
◊ Financial planning and control
◊ Project planning and scheduling

Analytical Methods for Engineers

This module is designed to equip the student with the understanding and knowledge of the mathematical requirements of the technology modules

◊ Algebraic methods
◊ Trigonometric methods
◊ Calculus
◊ Statistics and probability

Applications of Pneumatics and Hydraulics

◊ Fluid power diagrams
◊ Pneumatic and hydraulic components, equipment and plant
◊ Pneumatic and hydraulic circuits
◊ Industrial applications

Analytical Instrumentation

◊ Process sampling
◊ Analytical measurement instruments
◊ Chemical composition measurement instruments

Combinational & Sequential Logic†

◊ Circuits using combinational logic
◊ Circuits using sequential logic
◊ Digital systems

Control Systems and Automation

◊ Analytical techniques to form models
◊ Laplace transforms
◊ Bode standard second order equations
◊ Process controllers

Digital and Analogue Devices and Circuits†

◊ Power supplies for electronic systems
◊ Operational amplifier circuits
◊ Digital electronic circuits

Electrical and Electronic Principles

◊ Circuit theory
◊ Two-port networks
◊ Complex waves
◊ Transients in R-L-C circuits

Electrical Plant Protection

◊ Cable fault location
◊ Determination for system fault levels
◊ Protection transformers and relays
◊ Basic protection system design

Electrical Power

◊ **Three-phase systems**
◊ **Harmonics in power systems**
◊ **Methods of power distribution**
◊ **Economics of power systems and components**

Electrical Supply & Distribution System

◊ Transmission and distribution systems and configurations
◊ Diversity, load factor and tariffs
◊ Parallel operation of three-phase transformers
◊ Transmission feeder voltage levels
◊ Operating charactersitics of generators on infinite busbars
◊ Load flow between systems
◊ Supply system fault calculations
◊ Protection systems
◊ Circuit breakers

Electricity and Lighting

◊ Simple lighting applications
◊ Electrical distribution
◊ Legislation and standards for electrical installations
◊ Fire protection
◊ Motors and control installations

Electronics†

◊ Signals and noise
◊ Types of amplifier
◊ Circuits with feedback
◊ Oscillators

† Please ensure that you have access to suitable practical facilities to meet the requirements of the module.

Engineering Design

◊ Design specification
◊ Design report
◊ Computer-based technology in the design process

Engineering Science

◊ Static engineering systems
◊ Dynamic engineering systems
◊ DC and AC theory
◊ Information and energy control systems

Engineering Thermodynamics

◊ Thermodynamic systems
◊ Internal combustion engines
◊ Air compressors
◊ Steam and gas turbines

Fluid Mechanics

◊ Static fluid systems
◊ Viscosity
◊ Flow of real fluids
◊ Hydraulic machines

Heat Transfer and Combustion [Mechanical]

◊ Heat transfer rates
◊ Heat transfer coefficients
◊ Heat transfer equipment
◊ Combustion processes

Heat Transfer Science [Chemical]

◊ Heat transfer rates
◊ Overall heat transfer coefficient
◊ Heat transfer equipment
◊ Combustion processes

Heavy Current Applications

◊ Electrical and mechanical characteristics of rotating electrical machines
◊ Type of rotating machine required for a given application
◊ Operation and performance of transformers
◊ Type of transformer for a given application

Instrumentation and Control Principles

◊ Instrumentation systems used in process control
◊ Process control systems and controllers
◊ Regulating units

Manufacturing Process

◊ Conventional machining processes
◊ Moulding and shaping
◊ Non-conventional machining

Mass and Energy Balance

◊ Fundamentals: units and gas laws
◊ Conservation of mass: mass balance
◊ Recycle, purge and bypass streams in chemical processes
◊ Conservation of energy: energy balance

Mass Transfer Operations

◊ Mass transfer and phase equilibria
◊ Distillation
◊ Absorption of gases
◊ Liquid-liquid extraction
◊ Leaching
◊ Contacting equipment

Materials Engineering

◊ Suitable materials
◊ Relationships between manufacturing processes and materials' behaviour
◊ Materials and processing for a specified product
◊ Causes of failure of materials

Mechanical Principles

◊ Complex loading systems
◊ Loaded beams and cylinders
◊ Power transmission
◊ Dynamics of rotating systems

Mechatronic Systems Principles

◊ Mechatronic systems
◊ Control concepts
◊ Specification for a mechatronic system

Microprocessor Systems†

◊ Microprocessor-based systems
◊ Software for microprocessor-based systems
◊ Interfaces

Operational Amplifiers†

◊ Specifications and characteristics
◊ Design, building and testing
◊ Design of active filter to meet a given specification

Plant and Process Control

◊ Performance of a control system
◊ Specified performance in the time domain
◊ Specified performance in the frequency domain
◊ Control strategies for a complex control system

Plant and Process Principles

◊ Thermodynamic systems as applied to plant engineering processes
◊ Power transmission systems
◊ Static and dynamic fluid systems
◊ Combustion processes associated with plant engineering

Plant Maintenance and Management

◊ Types of maintenance
◊ Maintenance procedures and management strategies
◊ Decommissioning procedures

Plant Technology

◊ Safe and effective operation and testing of plant
◊ Steady flow energy equation
◊ Heat transfer applied to plant processes
◊ Power supply equipment

Power Electronics

◊ Characteristics and ratings of diodes and thyristors
◊ Uncontrolled and controlled AC to DC convertors
◊ AC voltage regulators
◊ Methods of DC motor control

Process Control

◊ Transient balances applied to process systems
◊ Measurement devices: temperature, pressure, flow, level and concentration
◊ Process dynamics
◊ Control strategies

Programmable Logic Controllers†

◊ Design and operation characteristics
◊ Information and communication techniques
◊ Programming techniques

Project

The aim of the project is to provide an opportunity for students to utilise their academic studies in the solution of a practical engineering problem.

◊ Select a project
◊ Implement the project
◊ Evaluate
◊ Present a project evaluation

Safety Engineering

◊ Introduction to safety engineering
◊ Character and treatment of hazards
◊ The application of protective measures

Software

◊ Analysis and design techniques applied to the software development process
◊ Development, compilation and running of programming code using C++
◊ Programming code using functions
◊ Testing methods and documentation for a given programming application

Utilisation of Electrical Energy

◊ Operation of power transformers
◊ Circuit protection for distribution and installation systems
◊ Design of a simple lighting system
◊ Energy management and tariffs
◊ Operation of a polyphase induction motor