CNC Power Engineering
Always on the move

CNC and Drives
Training catalogue 2019
Who besides you has the best expertise in your area of business?

The answer is obvious and quite simple: you are the expert in your field. Similarly, no one other than NUM could claim to have the deepest expertise of our extended range of drives and CNCs. After all, this has been our business for fifty years. This is why we are your number one partner for the training of your teams.

Whether you are a User, an OEM, a Maintenance specialist or a System builder, NUM has in its catalog all kind of training sessions dedicated to your applications and this for all generation of NUM products making parts on today machines.

Of course each customer has its own requirements, each machine and each application has its own specificities, and this is why we can also offer customized training sessions focused on your particular needs.

As a provider of CNC High End Applications, we have organized our training sessions by features and level of knowledge required, in order to help you to get all the data you need and only the data you need to be the most efficient. These sessions are conducted by training specialists and applications engineers so you can be assured that you will always get the most accurate and professional answers, whatever your question or concern might be. These sessions will give a chance to develop a durable relationship between our companies to further develop cooperation for the full benefit of all.
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Training with NUM: your advantages

- Technical data are up to date
- Should you need a specific function, you will get in depth information
- Partnership development
- You will be in touch with the experts in every domain of NUM activity
- Whatever your area of expertise might be (Maintenance, Service, Programming, Setup…), you will find the courses you need
- Full range of products and software in one location

Training centers

All NUM technical centers are equipped to provide training. These sessions will either take place in our premises or in your facility.
Flexium CNC and drives training courses
The different training modules are linked in a way to provide a logical path for mastering our application solutions in your area of expertise.

The training sessions can be
- Generic FXTR...
- Flexium specific FLTR...
- Flexium* specific FPTR...

The four main categories are
- Product characteristics F.TR001..
- Operation F.TR002..
- Maintenance F.TR003..
- Engineering and Setup F.TR004..

They are organized in three levels of expertise with a logical progression path
- Beginner 01
- Advanced 02
- Specialist x3 : x specific function
- Drive specialist x4 : x specific function

This structure is intended to providing you with the shortest and most efficient path to the success.

The following sessions are available:

<table>
<thead>
<tr>
<th>Cross range sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FXTR 101 Flexium system description</td>
</tr>
<tr>
<td>FXTR 102 Flexium and Safety</td>
</tr>
<tr>
<td>FXTR 201 Operation and basic maintenance</td>
</tr>
<tr>
<td>FXTR 202 Advanced part programming</td>
</tr>
<tr>
<td>FXTR 213 Flexium 3D</td>
</tr>
<tr>
<td>FXTR 223 Dynamic operators in C</td>
</tr>
<tr>
<td>FXTR 233 High speed cutting – 5 axes functions</td>
</tr>
<tr>
<td>FXTR 301 Flexium system maintenance with Flexium Tools</td>
</tr>
<tr>
<td>FXTR 320 Flexium system maintenance without Flexium Tools</td>
</tr>
<tr>
<td>FXTR 401 Flexium system initial setup</td>
</tr>
<tr>
<td>FXTR 423 NUMDrive C on CANOpen</td>
</tr>
<tr>
<td>FXTR 433 Extended NCK Access (ENA)</td>
</tr>
<tr>
<td>FXTR 443 Flexium HMI personalization</td>
</tr>
<tr>
<td>FXTR 453 Communication with Flexium</td>
</tr>
</tbody>
</table>
### Flexium specific sessions

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLTR 312</td>
<td>Flexium advanced maintenance</td>
</tr>
<tr>
<td>FLTR 314</td>
<td>NUMDrive C advanced maintenance</td>
</tr>
<tr>
<td>FLTR 402</td>
<td>Flexium system advanced setup</td>
</tr>
<tr>
<td>FLTR 463</td>
<td>Safety including SAM</td>
</tr>
</tbody>
</table>

### Flexium* specific sessions

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPTR 312</td>
<td>Flexium* system advanced maintenance</td>
</tr>
<tr>
<td>FPTR 314</td>
<td>NUMDrive X advanced maintenance</td>
</tr>
<tr>
<td>FPTR 402</td>
<td>Flexium* system advanced setup</td>
</tr>
<tr>
<td>FPTR 463</td>
<td>Safety including NUM-SAMX</td>
</tr>
</tbody>
</table>
Training path proposal

N.B.: For simplification purposes the three 0 digits following FXTR code has been suppressed in this figure. They are used to define the language of the training sessions.

N.B. 2: The sessions for specialists are chosen according to the options required. There is no need to attend them in sequence.

N.B. 3: Training courses for previous products are built on request.

N.B. 4: The question mark in F?TR stands for L (Flexium) or P (Flexium+).
## Course Schedule

<table>
<thead>
<tr>
<th>CLASS</th>
<th>CLASS TYPE</th>
<th>SYSTEM</th>
<th>1st QUARTER</th>
<th>2nd QUARTER</th>
<th>3rd QUARTER</th>
<th>4th QUARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>FXTR201</td>
<td>Operations - Basic Programming</td>
<td>Flexium &amp; Flexium*</td>
<td>1/28 to 1/30</td>
<td>4/29 to 5/1</td>
<td>7/29 to 7/31</td>
<td>10/21 to 10/23</td>
</tr>
<tr>
<td>FXTR202</td>
<td>Adv. ISO Programming</td>
<td>Flexium &amp; Flexium*</td>
<td>1/30 to 2/1</td>
<td>5/1 to 5/3</td>
<td>7/31 to 7/2</td>
<td>10/23 to 10/25</td>
</tr>
<tr>
<td>FXTR301</td>
<td>System Maintenance</td>
<td>Flexium &amp; Flexium*</td>
<td>2/4 to 2/6</td>
<td></td>
<td>8/5 to 8/7</td>
<td></td>
</tr>
<tr>
<td>FPTR301</td>
<td>System Maintenance</td>
<td>Flexium*</td>
<td></td>
<td>5/6 to 5/8</td>
<td></td>
<td>11/4 to 11/6</td>
</tr>
<tr>
<td>FXTR320</td>
<td>System Maintenance</td>
<td>Flexium &amp; Flexium*</td>
<td>2/11 to 2/13</td>
<td></td>
<td>8/12 to 8/14</td>
<td></td>
</tr>
<tr>
<td>FXTR401</td>
<td>System Startup</td>
<td>Flexium &amp; Flexium*</td>
<td>2/18 to 2/22</td>
<td>5/13 to 5/17</td>
<td>8/19 to 8/23</td>
<td>11/4 to 11/8</td>
</tr>
<tr>
<td>FXTR443/453</td>
<td>HMI Personalization</td>
<td>Flexium &amp; Flexium*</td>
<td>2/25 to 2/27</td>
<td></td>
<td>8/26 to 8/28</td>
<td></td>
</tr>
<tr>
<td>Seminar</td>
<td>General</td>
<td>Flexium* &amp; MDLUX</td>
<td></td>
<td></td>
<td>5/23 (Webinar)</td>
<td>11/21 (Webinar)</td>
</tr>
</tbody>
</table>

1. For courses not listed on the schedule please contact NUM USA directly.
2. Training for older NUM platform can be scheduled as "Individual Training".

### Please contact us for pricing

### Your training contacts

**USA:**

**Engineering Department**

Phone: +1 630 505 77 22

Fax: +1 630 505 77 54

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**Irma Roth**

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Fax: +41 71 333 35 87

sales.ch@num.com

*For other countries, please contact your local sales representative or NUM Switzerland.
Training organization

Quotation
Offers can be asked at your training contacts (see page 8).

Date and time table
Training dates and time tables will be part of a quotation.
For training site Naperville (IL, USA) you find these info on page 8.

Journey
Your local sales representative of NUM will provide you with journey information.
For training site Naperville (IL, USA) you find these info on page 37.

Hotels
Your local sales representative of NUM can recommend you hotels near to the training places.
For training site Naperville (IL, USA) you find these info on page 37.
# Flexium system description

## FXTR 101

### Your area of interest
General knowledge

### Prerequisite
None

### Objectives
- Understanding the Flexium range structure (CNCs and Drives)
- Understanding the main functions
- Ability to define a configuration with the Flexium catalogue

### Supports
Training materials
- Individual components
- Simulator

Deliveries
- Course presentation (printed and .pdf on CD)
- Flexium catalogue (on CD)

### Training Content

**Flexium CNC presentation**
- The different models of CNCs
- Hardware structure – Software functions

**The panels**
- PC Panels
- Machine panels

**The PLC**
- Structure
- Programming languages
- IOs

**NUMDrive C presentation**
- Hardware structure
- Drives functions and performances
- Axes and spindle motors

**NUMDrive X presentation**
- Hardware structure
- Drives functions and performances
- Axes and spindle motors

**Tools**
- PLC programming
- Web tools

**Applications**
- From the single unit CNC to the multi CNC - multi panels configurations

### Duration
1 day

### Date / Costs
Please consult your local training contact
# Flexium and Safety

## FXTR 102

### Your area of interest

| General knowledge |

### Prerequisite

| None |

### Objectives

- ✓ Understanding the Flexium and Flexium* safety concepts
- ✓ Understanding the various safety features
- ✓ Ability to define the components and development required for a particular configuration

### Supports

<table>
<thead>
<tr>
<th>Training materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual components</td>
</tr>
<tr>
<td>Simulator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course presentation (printed and .pdf on CD)</td>
</tr>
<tr>
<td>Flexium catalogue (on CD)</td>
</tr>
</tbody>
</table>

### Training Content

#### Safety: What is it?

- Safety PLCs
- Safe motions
- Safety level

#### General on EtherCAT and FSoE

#### The Safe PLC

- Structure
- Programming languages
- I/Os

#### Safety and Motions

- SAM, STO and NUMDrive C
- SAMX, STOX and NUMDrive X

#### Questions and answers (1/2 hour)

### Duration

| 1 day |

### Date / Costs

| Please consult your local training contact |
## Operation and basic maintenance

### Your area of interest
- Machine operator – 1st level maintenance

### Prerequisite
- Knowledge of NUM products or FXTR101

### Objectives
- Ability to run a machine equipped with Flexium system
- Understanding and adjusting the coordinate systems and tools offsets
- Understanding operators message and status indicators to perform a first level maintenance

### Supports
- Training materials
  - Individual components
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Programming manual (CD)

### Training Content

**Operation**
- Using the HMI
- Modes of operation
- ISO concepts (interpolation – feedrate – tools offsets – main canned cycles)
- Coordinate systems – programmable axes
- Work preparation, tools offsets, origin presets
- Basic of parametric programming

**Maintenance**
- Status indicators
- Operators messages
- LED indications
- Backup of essential data
- Adding a system option

### Tools
- Web tools
- Flexium license loader

### Duration
- 2.5 days

### Questions and answers (2 hours)
- Please consult your local training contact
## Advanced part programming

### FXTR 202

### Your area of interest

Advanced part programming – custom macros – special functions for OEM

### Prerequisite

Level FXTR 201

### Objectives

- Mastering the advanced ISO functions of the system
- Ability to create a custom macro (tool changer – milling head exchange – probing etc.)

### Supports

- Training materials
  - Individual components
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Programming and advanced programming manual (CD)

### Training Content

#### Advanced ISO functions

- Polar programming
- Probing management
- Pocket cycles
- Complements on parametric programming
  - Detailed information on E parameters
  - Relation with the outside via the PLC
- Structured programming
- Dynamic operators
- Customized G codes

#### Exercises

Questions and answers

### Duration

2.5 days

### Date / Costs

Please consult your local training contact
Flexium 3D

Your area of interest
Machine operation - Programming

Objectives
✓ Using Flexium 3D to validate a part program
✓ Interacting with Flexium HMI to correct possible programming faults
✓ Optional : Customizing Flexium 3D for machine simulation

Prerequisite
Knowledge of NUM products or FXTR201

Supports
Training materials
  ○ Simulator
Deliveries
  ○ Course presentation (printed and .pdf on CD)

Training Content
Flexium 3D presentation
  ○ Principle of operation
  ○ The different screens

Running Flexium 3D
  ○ Program configuration
  ○ Defining the blank and the tools
  ○ Off line and On line simulation

Exercises
Optional
  ○ Designing a machine model

Questions and answers (2 hours)

Duration
1 day + 1 day optional

Date / Costs
Please consult your local training contact
# Dynamic operators in C

## Your area of interest
- General knowledge

## Prerequisite
- FXTR202 – C language

## Objectives
- Develop an application using dynamic operators in C

## Supports
- **Training materials**
  - Individual components
  - Simulator
- **Deliveries**
  - Course presentation (printed and .pdf on CD)
  - Flexium catalogue (on CD)

## Training Content
- Principle of dynamic operators
- Short example using classic dynamic operators
- Review list of parameters
- The compiler
- Examples
- Trace and debug

## Duration
- 1 day

## Date / Costs
- Please consult your local training contact
<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>General knowledge</td>
<td>FXTR 202 – FXTR 401</td>
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</table>

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Mastering 5 axes machining functions</td>
</tr>
<tr>
<td>✓ RTCP (Rotating Tool Centre Point)</td>
</tr>
<tr>
<td>✓ Inclined plane</td>
</tr>
<tr>
<td>✓ High speed cutting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training materials</td>
</tr>
<tr>
<td>○ Individual components</td>
</tr>
<tr>
<td>○ Simulator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Course presentation (printed and .pdf on CD)</td>
</tr>
<tr>
<td>○ Flexium catalogue (on CD)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ NC 5 axes functions</td>
</tr>
<tr>
<td>○ RTCP and inclined plane parameterization</td>
</tr>
<tr>
<td>○ Application</td>
</tr>
<tr>
<td>○ High speed machining functions</td>
</tr>
<tr>
<td>○ Speed and acceleration controls</td>
</tr>
<tr>
<td>○ Optimization of parameters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Date / Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days</td>
<td>Please consult your local training contact</td>
</tr>
</tbody>
</table>
Flexium system maintenance with Flexium Tools

**Your area of interest**
Maintenance

**Prerequisite**
Level FXTR101

**Objectives**
- Ability to detect and replace defective components in a short time
- Predictive maintenance

**Supports**
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

**Training Content**
- Flexium system maintenance
  - System structure
  - Components
  - System startup
  - Diagnostics
  - Software updates
  - Service tool
  - Safety
  - Backup and Restore procedures
  - Part replacement
- Drives maintenance
  - Product knowledge
  - Drives exchange procedure
- Questions and answers (1 hour)

**Duration**
2.5 days

**Date / Costs**
Please consult your local training contact
## Flexium system maintenance without Flexium Tools

### FXTR 320

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Level FXTR101</td>
</tr>
</tbody>
</table>

### Objectives

- ✓ Ability to detect and replace defective components in a short time
- ✓ Predictive maintenance

### Supports

- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

### Training Content

- **Flexium system maintenance**
  - System structure
  - Components
  - System startup
  - Diagnostics
  - Software updates
  - Service tool
  - Safety
  - Backup and Restore procedures
  - Part replacement

- **Drives maintenance**
  - Product knowledge
  - Drives exchange procedure

- Questions and answers (1 hour)

### Duration

- 2.5 days

### Date / Costs

- Please consult your local training contact
### Flexium system advanced maintenance

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Level FXTR301</td>
</tr>
</tbody>
</table>

**Objectives**
- Ability to detect and replace defective components in a short time
- Predictive maintenance

**Supports**
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

**Training Content**

<table>
<thead>
<tr>
<th>Flexium system maintenance</th>
<th>NUMDrive C advanced maintenance</th>
</tr>
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<tbody>
<tr>
<td>○ Detailing the product structure</td>
<td>○ Detailed analysis</td>
</tr>
<tr>
<td>○ Exchange zone</td>
<td>○ Drives instruments</td>
</tr>
<tr>
<td>○ Troubleshooting with Flexium HMI</td>
<td>○ Drives exchange procedure</td>
</tr>
<tr>
<td>○ Flexium Tools</td>
<td>○ Safety application maintenance</td>
</tr>
<tr>
<td>○ Parameters modification</td>
<td></td>
</tr>
<tr>
<td>○ Debugging with the PLC</td>
<td>Questions and answers (1 hour)</td>
</tr>
<tr>
<td>○ PLC program adjustments</td>
<td></td>
</tr>
<tr>
<td>○ Backup and restore</td>
<td></td>
</tr>
</tbody>
</table>

**Duration**
- 3 days

**Date / Costs**
- Please consult your local training contact
# Flexium® system advanced maintenance

## Your area of interest
Maintenance

## Prerequisite
Level FXTR301

## Objectives
- Ability to detect and replace defective components in a short time
- Predictive maintenance

## Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

## Training Content

### Flexium® system maintenance
- Detailing the product structure
- Exchange zone
- Troubleshooting with Flexium HMI
- Flexium Tools
- Parameters modification
- Debugging with the PLC
- PLC program adjustments
- Backup and restore

### NUMDrive X drives advanced maintenance
- Detailed analysis
- Drives instruments
- Drives exchange procedure
- Safety application maintenance

### Questions and answers (1 hour)

## Duration
3 days

## Date / Costs
Please consult your local training contact
### NUMDrive C advanced maintenance

**FLTR 314**

#### Your area of interest
- Machine maintenance

#### Prerequisite
- Level FXTR 301

#### Objectives
- ✓ Ability to detect and replace components or adjust parameters

#### Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

#### Training Content

**Review**
- Range description
- Troubleshooting with Flexium HMI

**Components connections**
- Structure of a NUMDrive C application

**Adjustments**
- Using Flexium Tools for diagnostic
- Main drive parameters
- Adjustment and control

**Questions and answers**

#### Duration
- 2.5 days

#### Date / Costs
- Please consult your local training contact
## NUMDrive X advanced maintenance

### Your area of interest
Machine maintenance

### Prerequisite
Level FXTR 301

### Objectives
- Ability to detect and replace components or adjust parameters

### Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

### Training Content
**Review**
- Range description
- Troubleshooting with Flexium HMI

**Components connections**
- Structure of a NUMDrive X application

**Adjustments**
- Using Flexium Tools for diagnostic
- Main drive parameters
- Adjustment and control

**Questions and answers**

### Duration
2.5 days

### Date / Costs
Please consult your local training contact
## Flexium system initial setup

### Your area of interest

Engineering and Setup

### Prerequisite

FXTR201

### Objectives

- Create a first Flexium application for a machine
- Control basic functions – Run two axes and a spindle

### Supports

#### Training materials
- Simulator

#### Deliveries
- Course presentation (printed and .pdf on CD)
- Installation manual – Commissioning manual – Flexium Tools (all on CD)

### Training Content

#### Understanding Flexium structure

Flexium Tools presentation
- Getting familiar with the package
- Languages
- Variables
- Structure of a project

#### Practical exercise

- Creating the machine structure
- Integrating IOs (CANopen and Ethernet)
- Integrating a panel
- Handling modes, manual and automatic commands
- Operator messages
- Power on, security
- Integrating axes and spindle
- First level of parameterization
- Running a simple part program
- Introduction to the custom visualization

### Questions and answers

### Duration

5 days

### Date / Costs

Please consult your local training contact
## Flexium system advanced setup

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Setup</td>
<td>FXTR 401</td>
</tr>
</tbody>
</table>

### Objectives
- Commissioning a Flexium system on any kind of machine

### Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Full set of Flexium manuals – Flexium Tools
  - Example project (all on CD)

### Training Content
- Detailed analysis of exchange variables
- Flexium Tools complements
  - Project simulation and debug
  - Application control (Tasks – automated checks)
  - Field bus control
  - Advanced functions (Probing – tool wear – shutdown etc.)
  - Custom screens complements
  - Optional functions (multi NCK – multi panels etc.)
  - Writing custom libraries

### Questions and answers

### Duration
- 5 days

### Date / Costs
- Please consult your local training contact
## Flexium⁺ system advanced setup

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Setup</td>
<td>FXTR 401</td>
</tr>
</tbody>
</table>

### Objectives
- Commissioning a Flexium system on any kind of machine

### Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Full set of Flexium manuals – Flexium Tools
  - Example project (all on CD)

### Training Content
- Detailed analysis of exchange variables
- Flexium Tools complements
  - Project simulation and debug
  - Application control (Tasks – automated checks)
  - Field bus control
  - Advanced functions (Probing – tool wear – shutdown etc.)
  - Custom screens complements
  - Optional functions (multi NCK – multi panels etc.)
  - Writing custom libraries

### Questions and answers

### Duration
- 5 days

### Date / Costs
- Please consult your local training contact
### NUMDrive C on CANopen

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Setup</td>
<td>F?TR 402 required</td>
</tr>
</tbody>
</table>

### Objectives

- Control of one or more NUMDrive C over CANopen

### Supports

- Training materials
  - Simulator

- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Full set of Flexium manuals – Flexium Tools – Example project (all on CD)

### Training Content

- Recalls on CANopen

- NUMDrive C library
  - Available parameters and functions

- Application
  - Parameters settings
  - Position control
  - Velocity control

- Questions and answers

### Duration

- 2 days

### Date / Costs

- Please consult your local training contact
## Extended NCK Access (ENA)

### Your area of interest
- Engineering and Setup

### Prerequisite
- F?TR 402 required

## Objectives
- Exchange of additional data between NCK and PLC

## Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Flexium Tools – Example project

## Training Content
- Structure of internal communication in Flexium systems
- ENA library
  - Available parameters and functions
- Application
  - Reading parameters
  - Writing parameters
  - Files management
- Questions and answers

## Duration
- 2 days

## Date / Costs
- Please consult your local training contact
# Flexium HMI personalization

## Your area of interest

Engineering and Setup

## Prerequisite

- FXTR 101
- Windows knowledge
- Programming knowledge of script languages

## Objectives

- Creating Flexium HMI custom pages in HTML/JavaScript

## Supports

- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Software Development Kit access
  - Example (on CD)

## Training Content

### Introduction in the architecture of Flexium HMI

### Explanation of the Flexium HMI components

- FXBrowser
- FXServer
- FXLib
- FXLog

### Structure of configuration files

- FXServer.ini
- FXUser.ini

### Explanation of the FXServer architecture

- Event handling
- Task management
- ...

### Abstract of development tools

### Exercises related to practice using HTML and JavaScript

- Object instancing of the classes of the development components
- Using of the development components
- Characteristics of the array structure of event classes
- Programming examples

### Questions and answers

## Duration

3 days

## Date / Costs

Please consult your local training contact
# Communication with Flexium

## Your area of interest

<table>
<thead>
<tr>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Setup</td>
</tr>
</tbody>
</table>

## Prerequisite

- FXTR 101
- Windows knowledge
- Knowledge of object oriented programming (OOP) and use of COM server

## Objectives

- Using of FXServer for the communication with the different components of Flexium

## Supports

- Training materials
  - Simulator

## Deliveries

- Course presentation (printed and .pdf on CD)
- Software Development Kit access
- Programming examples in C# and C++ (on CD)

## Training Content

| Introduction in the architecture of FXServer |
| Explanation of the Flexium components (FXServer, FXLib, FXLog) and configuration file (FXServer.ini) |
| Explanation of the FXServer architecture (Event handling, task management, …) |

| Exercises related to practice using C# |
| Object referencing and instancing of the classes of the development components |
| Using of the development components |
| Characteristics of the array structure of event classes |
| Programming examples |

## Duration

- 3 days

## Date / Costs

- Please consult your local training contact
### Safety including SAM

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Setup</td>
<td>FXTR 102 or FLTR 402</td>
</tr>
</tbody>
</table>

#### Objectives

- Understand concept.
- Program and Set-Up a safety application on a Flexium system

#### Supports

- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Software Development Kit access
  - Example (on CD)

#### Training Content

- Hardware structure
- Safety functions
- Safety application concept
- Safe PLC programming
- Drive functions
  - STO setup
  - SAM setup
- Questions and answers

#### Duration

- 1 day

#### Date / Costs

Please consult your local training contact
# Safety including NUM-SAMX

## Your area of interest
- Engineering and Setup

## Prerequisite
- FXTR 102 or FPTR 402

## Objectives
- Understand concept.
- Program and setup a safety application on a Flexium system

## Supports
- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Software Development Kit access
  - Example (on CD)

## Training Content
- Hardware structure
- Safety functions
- Safety application concept
- Safe PLC programming
- Drive functions
  - NUM-STOX setup
  - NUM-SAMX setup
- Questions and answers

## Duration
- 2 days

## Date / Costs
- Please consult your local training contact
# Axium system maintenance

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>None</td>
</tr>
</tbody>
</table>

## Objectives

- ✓ Ability to detect and replace defective components in a short time
- ✓ Predictive maintenance

## Supports

- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)

## Training Content

Axium system maintenance
- System structure
- Components
- System startup
- Diagnostics
- Software updates
- Service tool
- Safety
- Part replacement

Drives maintenance
- Product knowledge
- Drives exchange procedure

Questions and answers (1 hour)

## Duration

5 days

## Date / Costs

Please consult your local training contact
## Individual trainings

<table>
<thead>
<tr>
<th>Your area of interest</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Something around NUM controls</td>
<td>Depending on the training content</td>
</tr>
</tbody>
</table>

### Objectives

- Will be defined with you

### Supports

- Training materials
  - Simulator
- Deliveries
  - Course presentation (printed and .pdf on CD)
  - Example (on CD) if available

### Training Content

Will be developed with you

### Duration

To be defined

### Date / Costs

Please consult your local training contact

Individual trainings can happen at NUM locations or customer site.
Seminar

Your area of interest

General

Prerequisite

None

Objectives

✓ Present NUM's newest innovations in CNC, servo motors and drive technology

Supplementary Items

Training materials
- Simulator

Media
- Course presentation (.pdf on USB)
- Example (on USB) if available

Training Content

Topics include the newest innovations in CNC, servo motors and drive technology. Additional topics include NUM services, maintenance techniques and a range of innovative complete solutions for CNC and machine tool retrofits

Duration

.5 days

Date / Costs

- Refer to Course Schedule
- Free of charge
Organization / Terms of business

Training Facilities  **United States:**

NUM USA  
603 E. Diehl Road Suite 115  
Naperville, IL 60563  
Phone  +1 630 505 7722  
Fax  +1 630 505 7754  
sales.us@num.com

**Journey / Hotels**  Short descriptions of the journey and hotels near to the training site are described on page 37.

**Cost**  Contact your local NUM office.

**Time**  Classes begin at 08:30 a.m. and end at about 5:00 p.m., with 1 hour lunch break.

**Booking**  All classes require a minimum of 3 persons. Insufficient enrollment 3 weeks prior to the class date will result in course cancellation.

Student cancellations will not be accepted within 3 weeks prior to the course start date. Student will be invoiced as if attending the course.
Booking form
For booking of training please send an e-mail to following address with content below:
sales.us@num.com

For other countries, please contact your local sales representative or NUM Switzerland
(sales.ch@num.com).

E-mail content
Company name:
Contact person:
Function:
Phone:
Address:

Your order number:

Training number:
Training date:
Training location:
Names of the participants:
Journey to NUM USA

From O'Hare Int'l Airport:

Hotel with NUM discount:

**Hampton Inn**
1087 E. Diehl Road
(630) 505-1400
Continental breakfast included. Area shuttle, exercise room and seasonal outdoor pool available. Ask for NUM USA rate to get a 25% discount.

**Hotel Indigo Naperville Riverwalk - Downtown**
120 Water Street
(630) 778 9676
Some customers prefer this downtown Riverwalk location with walking distance to shopping, restaurants, bars, etc... The Hotel has free wifi with full service restaurant serving breakfast, lunch, dinner, exercise room, free weights and cardio equipment. Complimentary shuttle service to and from NUM offices and within 5 mile radius of hotel - based upon availability. Ask for the NUM Corporation rate. 15-25% off. (Corp ID 786866549, IATA# 99502056)

From Midway Airport: