

# CNC Power Engineering

## Always on the move



## CNC and Drives

### Training catalogue 2017

## 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.



Some training facilities



## 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:

### Cross range sessions

FXTR 101	Flexium system description
FXTR 102	Flexium and Safety
FXTR 201	Operation and basic maintenance
FXTR 202	Advanced part programming
FXTR 213	Flexium 3D
FXTR 223	Dynamic operators in C
FXTR 233	High speed cutting – 5 axes functions
FXTR 301	Flexium system maintenance
FXTR 401	Flexium system initial setup
FXTR 423	NUMDrive C on CANOpen
FXTR 433	Extended NCK Access (ENA)
FXTR 443	Flexium HMI personalization
FXTR 453	Communication with Flexium

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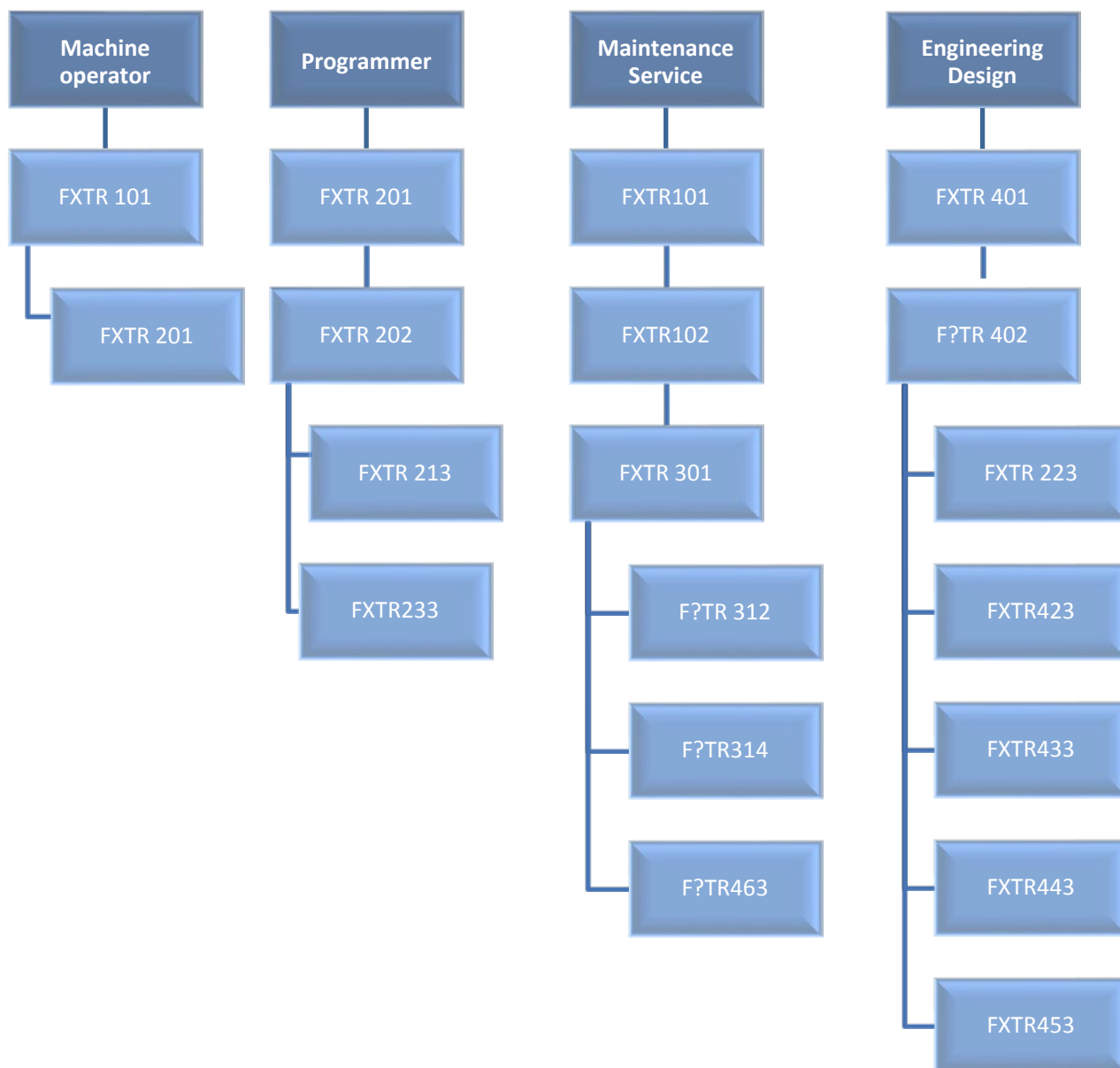
### Flexium specific sessions

FLTR 312	Flexium advanced maintenance
FLTR 314	NUMDrive C advanced maintenance
FLTR 402	Flexium system advanced setup
FLTR 463	Safety including SAM

### Flexium+ specific sessions

FPTR 312	Flexium+ system advanced maintenance
FPTR 314	NUMDrive X advanced maintenance
FPTR 402	Flexium+ system advanced setup
FPTR 463	Safety including NUM-SAMX

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<sup>+</sup>)

## Course Schedule

CLASS	CLASS TYPE	SYSTEM	1 <sup>st</sup> QUARTER	2 <sup>nd</sup> QUARTER	3 <sup>rd</sup> QUARTER	4 <sup>th</sup> QUARTER
FXTR201	Operations - Basic Programming	Flexium	January 30 <sup>th</sup> to February 1 <sup>st</sup>	April 17 <sup>th</sup> to 19 <sup>th</sup>	July 17 <sup>th</sup> to 19 <sup>th</sup>	October 9 <sup>th</sup> to 11 <sup>th</sup>
FXTR202	Adv. ISO Programming	Flexium	February 1 <sup>st</sup> to 3 <sup>rd</sup>	April 19 <sup>th</sup> to 21 <sup>st</sup>	July 19 <sup>th</sup> to 21 <sup>st</sup>	October 11 <sup>th</sup> to 13 <sup>th</sup>
FXTR301/ FPTR301	System Maintenance	Flexium	February 6 <sup>th</sup> to 8 <sup>th</sup>	<b>April 24<sup>th</sup> to 26<sup>th</sup></b>	July 24 <sup>th</sup> to 26 <sup>th</sup>	<b>October 23<sup>rd</sup> to 25<sup>th</sup></b>
FLTR314/ FPTR314	Digital Drives	Flexium / MDLU	February 8 <sup>th</sup> to 10 <sup>th</sup>	<b>April 26<sup>th</sup> to May 28<sup>th</sup></b>	July 26 <sup>th</sup> to 28 <sup>th</sup>	<b>October 25<sup>th</sup> to 27<sup>th</sup></b>
FXTR401	System Startup	Flexium	February 20 <sup>th</sup> to 24 <sup>th</sup>	May 1 <sup>st</sup> to 5 <sup>th</sup>	July 31 <sup>st</sup> to August 4 <sup>th</sup>	October 30 <sup>st</sup> to November 3 <sup>rd</sup>
FLTR402/ FPTR402	Adv. Flexium Tools Config. (5 days)	Flexium		May 8 <sup>th</sup> to 12 <sup>th</sup>		November 6 <sup>th</sup> to 10 <sup>th</sup>
FXTR443/ 453	HMI Personalization	Flexium / Axiom	February 15 <sup>th</sup> to 17 <sup>th</sup>		August 7 <sup>th</sup> to 9 <sup>th</sup>	
APTR201	System Maintenance	10xx / Axiom	TBD	TBD	TBD	TBD
Seminar	General	Flexium / Drives		May 17 <sup>th</sup> (Webinar)	August 23 <sup>rd</sup> (Webinar)	

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

## Course Costs

FXTR201 ..... (2.5 days)  
 FXTR202 ..... (2.5 days)  
 FXTR301 ..... (2.5 days)  
 FLTR314/FPTR314 ..... (2.5 days)  
 FXTR401 ..... (5 days)  
 FLTR402/FPTR402 ..... (5 days)  
 FXTR443/453 ..... (3 days)  
 APTR201 ..... (5 days)  
 Seminar (Webinar)..... (5 days)

## Your training contacts

### USA:

#### Engineering Department

Phone: +1 630 505 77 22

Fax: +1 630 505 77 54

sales.us@num.com

### \*Switzerland:

#### Edith Lindauer

Phone: +41 71 335 04 11

Fax: +41 71 333 35 87

sales.ch@num.com

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



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## 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 36.

### 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 36.

# Flexium system description

# FXTR 101

Your area of interest	Prerequisite
General knowledge	None
Objectives	Supports
<ul style="list-style-type: none"> <li>✓ Understanding the Flexium range structure (CNCs and Drives)</li> <li>✓ Understanding the main functions</li> <li>✓ Ability to define a configuration with the Flexium catalogue</li> </ul>	<p>Training materials</p> <ul style="list-style-type: none"> <li>○ Individual components</li> <li>○ Simulator</li> </ul> <p>Deliveries</p> <ul style="list-style-type: none"> <li>○ Course presentation (printed and .pdf on CD)</li> <li>○ Flexium catalogue (on CD)</li> </ul>
Training Content	
<p>Flexium CNC presentation</p> <ul style="list-style-type: none"> <li>○ The different models of CNCs</li> <li>○ Hardware structure – Software functions</li> </ul> <p>The panels</p> <ul style="list-style-type: none"> <li>○ PC Panels</li> <li>○ Machine panels</li> </ul> <p>The PLC</p> <ul style="list-style-type: none"> <li>○ Structure</li> <li>○ Programming languages</li> <li>○ IOs</li> </ul> <p>NUMDrive C presentation</p> <ul style="list-style-type: none"> <li>○ Hardware structure</li> <li>○ Drives functions and performances</li> <li>○ Axes and spindle motors</li> </ul>	<p>NUMDrive X presentation</p> <ul style="list-style-type: none"> <li>○ Hardware structure</li> <li>○ Drives functions and performances</li> <li>○ Axes and spindle motors</li> </ul> <p>Tools</p> <ul style="list-style-type: none"> <li>○ PLC programming</li> <li>○ Web tools</li> </ul> <p>Applications</p> <ul style="list-style-type: none"> <li>○ From the single unit CNC to the multi CNC - multi panels configurations</li> </ul> <p>Questions and answers (1/2 hour)</p>
Duration	Date / Costs
1 day	Please consult your local training contact

# Flexium and Safety

# FXTR 102

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## Your area of interest

General knowledge

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## Prerequisite

None

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## Objectives

- ✓ Understanding the Flexium and Flexium<sup>+</sup> safety concepts
- ✓ Understanding the various safety features
- ✓ Ability to define the components and development required for a particular configuration

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## Supports

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

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## 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)

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## Duration

1 day

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## Date / Costs

Please consult your local training contact

# Operation and basic maintenance

# FXTR 201

Your area of interest	Prerequisite
Machine operator – 1 <sup>st</sup> level maintenance	Knowledge of NUM products or FXTR101
Objectives	Supports
<ul style="list-style-type: none"> <li>✓ Ability to run a machine equipped with Flexium system</li> <li>✓ Understanding and adjusting the coordinate systems and tools offsets</li> <li>✓ Understanding operators message and status indicators to perform a first level maintenance</li> </ul>	<p>Training materials</p> <ul style="list-style-type: none"> <li>○ Individual components</li> <li>○ Simulator</li> </ul> <p>Deliveries</p> <ul style="list-style-type: none"> <li>○ Course presentation (printed and .pdf on CD)</li> <li>○ Programming manual (CD)</li> </ul>
Training Content	
<p>Operation</p> <ul style="list-style-type: none"> <li>○ Using the HMI</li> <li>○ Modes of operation</li> <li>○ ISO concepts (interpolation – feedrate – tools offsets – main canned cycles)</li> <li>○ Coordinate systems – programmable axes</li> <li>○ Work preparation, tools offsets, origin presets</li> <li>○ Basic of parametric programming</li> </ul> <p>Maintenance</p> <ul style="list-style-type: none"> <li>○ Status indicators</li> <li>○ Operators messages</li> <li>○ LED indications</li> <li>○ Backup of essential data</li> <li>○ Adding a system option</li> </ul>	<p>Tools</p> <ul style="list-style-type: none"> <li>○ Web tools</li> <li>○ Flexium license loader</li> </ul> <p>Questions and answers (2 hours)</p>
Duration	Date / Costs
2.5 days	Please consult your local training contact

# Advanced part programming

# FXTR 202

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## Your area of interest

Advanced part programming – custom macros – special functions for OEM

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## Prerequisite

Level FXTR 201

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## Objectives

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

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## Supports

Training materials

- Individual components
- Simulator

Deliveries

- Course presentation (printed and .pdf on CD)
- Programming and advanced programming manual (CD)

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## 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

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## Duration

2.5 days

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## Date / Costs

Please consult your local training contact

# Flexium 3D

# FXTR 213

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## Your area of interest

Machine operation - Programming

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## Prerequisite

Knowledge of NUM products or FXTR201

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## 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

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## Supports

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

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## 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)

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## Duration

1 day + 1 day optional

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## Date / Costs

Please consult your local training contact

# Dynamic operators in C

**FXTR 223**

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## Your area of interest

General knowledge

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## Prerequisite

FXTR202 – C language

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## Objectives

- ✓ Develop an application using dynamic operators in C

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## Supports

Training materials

- Individual components
- Simulator

Deliveries

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

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## Training Content

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

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## Duration

1 day

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## Date / Costs

Please consult your local training contact

# High Speed Cutting – 5 axes functions

**FXTR 233**

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## Your area of interest

General knowledge

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## Prerequisite

FXTR202 – FXTR 401

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## Objectives

- ✓ Mastering 5 axes machining functions
- ✓ RTCP (Rotating Tool Centre Point)
- ✓ Inclined plane
- ✓ High speed cutting

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## Supports

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

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## Training Content

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>○ NC 5 axes functions</li> <li>○ RTCP and inclined plane parameterization</li> <li>○ Application</li> <li>○ High speed machining functions</li> <li>○ Speed and acceleration controls</li> <li>○ Optimization of parameters</li> </ul> | <ul style="list-style-type: none"> <li>○ Axes adjustments</li> <li>○ Flexium tools instruments</li> <li>○ Practical case</li> </ul> <p>Questions and answers (1/2 hour)</p> |
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## Duration

2 days

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## Date / Costs

Please consult your local training contact



# Flexium system maintenance

# FXTR 301

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## Your area of interest

Maintenance

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## Prerequisite

Level FXTR101

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## Objectives

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

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## Supports

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

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## Training Content

Flexium 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)

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## Duration

2.5 days

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## Date / Costs

Please consult your local training contact

# Flexium system advanced maintenance

FLTR 312

## Your area of interest

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Maintenance

## Prerequisite

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Level FXTR301

## Objectives

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

## Supports

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

## Training Content

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### 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 C advanced maintenance

- Detailed analysis
- Drives instruments
- Drives exchange procedure
- Safety application maintenance

Questions and answers (1 hour)

## Duration

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3 days

## Date / Costs

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Please consult your local training contact

# Flexium<sup>+</sup> system advanced maintenance

**FPTR 312**

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## Your area of interest

Maintenance

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## Prerequisite

Level FXTR301

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## Objectives

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

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## Supports

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

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## Training Content

### Flexium<sup>+</sup> 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)

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## Duration

3 days

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## Date / Costs

Please consult your local training contact

# NUMDrive C advanced maintenance

FLTR 314

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## Your area of interest

Machine maintenance

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## Prerequisite

Level FXTR 301

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## Objectives

- ✓ Ability to detect and replace components or adjust parameters

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## Supports

Training materials

- Simulator

Deliveries

- Course presentation (printed and .pdf on CD)

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## 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

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## Duration

2.5 days

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## Date / Costs

Please consult your local training contact

# NUMDrive X advanced maintenance

**FPTR 314**

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## Your area of interest

Machine maintenance

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## Prerequisite

Level FXTR 301

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## Objectives

- ✓ Ability to detect and replace components or adjust parameters

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## Supports

Training materials

- Simulator

Deliveries

- Course presentation (printed and .pdf on CD)

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## 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

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## Duration

2.5 days

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## Date / Costs

Please consult your local training contact

# Flexium system initial setup

**FXTR 401**

Your area of interest	Prerequisite
Engineering and Setup	FXTR201
Objectives	Supports
<ul style="list-style-type: none"> <li>✓ Create a first Flexium application for a machine</li> <li>✓ Control basic functions – Run two axes and a spindle</li> </ul>	<p>Training materials</p> <ul style="list-style-type: none"> <li>○ Simulator</li> </ul> <p>Deliveries</p> <ul style="list-style-type: none"> <li>○ Course presentation (printed and .pdf on CD)</li> <li>○ Installation manual – Commissioning manual – Flexium Tools (all on CD)</li> </ul>
Training Content	
<p>Understanding Flexium structure</p> <p>Flexium Tools presentation</p> <ul style="list-style-type: none"> <li>○ Getting familiar with the package</li> <li>○ Languages</li> <li>○ Variables</li> <li>○ Structure of a project</li> </ul> <p>Practical exercise</p> <ul style="list-style-type: none"> <li>○ Creating the machine structure</li> <li>○ Integrating IOs (CANopen and Ethernet)</li> <li>○ Integrating a panel</li> <li>○ Handling modes, manual and automatic commands</li> <li>○ Operator messages</li> <li>○ Power on, security</li> <li>○ Integrating axes and spindle</li> <li>○ First level of parameterization</li> <li>○ Running a simple part program</li> <li>○ Introduction to the custom visualization</li> </ul>	Questions and answers
Duration	Date / Costs
5 days	Please consult your local training contact

# Flexium system advanced setup

FLTR 402

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## Your area of interest

Engineering and Setup

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## Prerequisite

FXTR 401

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## Objectives

- ✓ Commissioning a Flexium system on any kind of machine

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## Supports

Training materials

- Simulator

Deliveries

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

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## Training Content

Detailed analysis of exchange variables

Questions and answers

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

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## Duration

5 days

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## Date / Costs

Please consult your local training contact

# Flexium<sup>+</sup> system advanced setup

**FPTR 402**

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## Your area of interest

Engineering and Setup

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## Prerequisite

FXTR 401

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## Objectives

- ✓ Commissioning a Flexium system on any kind of machine

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## Supports

Training materials

- Simulator

Deliveries

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

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## Training Content

Detailed analysis of exchange variables

Questions and answers

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

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## Duration

5 days

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## Date / Costs

Please consult your local training contact



# NUMDrive C on CANopen

**FXTR 423**

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## Your area of interest

Engineering and Setup

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## Prerequisite

F?TR 402 required

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## Objectives

- ✓ Control of one or more NUMDrive C over CANopen

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## Supports

Training materials

- Simulator

Deliveries

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

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## Training Content

Recalls on CANopen

NUMDrive C library

- Available parameters and functions

Application

- Parameters settings
- Position control
- Velocity control

Questions and answers

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## Duration

2 days

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## Date / Costs

Please consult your local training contact

## Extended NCK Access (ENA)

**FXTR 433**

Your area of interest	Prerequisite
Engineering and Setup	F?TR 402 required
Objectives	Supports
<ul style="list-style-type: none"> <li>✓ Exchange of additional data between NCK and PLC</li> </ul>	Training materials <ul style="list-style-type: none"> <li>○ Simulator</li> </ul> Deliveries <ul style="list-style-type: none"> <li>○ Course presentation (printed and .pdf on CD)</li> <li>○ Flexium Tools – Example project</li> </ul>
Training Content	
Structure of internal communication in Flexium systems	
ENA library <ul style="list-style-type: none"> <li>○ Available parameters and functions</li> </ul>	
Application <ul style="list-style-type: none"> <li>○ Reading parameters</li> <li>○ Writing parameters</li> <li>○ Files management</li> </ul>	
Questions and answers	
Duration	Date / Costs
2 days	Please consult your local training contact

# Flexium HMI personalization

**FXTR 443**

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## Your area of interest

Engineering and Setup

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## Prerequisite

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

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## Objectives

- ✓ Creating Flexium HMI custom pages in HTML/JavaScript

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## Supports

Training materials

- Simulator

Deliveries

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

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## 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

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## Duration

3 days

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## Date / Costs

Please consult your local training contact

# Communication with Flexium

**FXTR 453**

Your area of interest	Prerequisite
Engineering and Setup	<ul style="list-style-type: none"> <li>○ FXTR 101</li> <li>○ Windows knowledge</li> <li>○ Knowledge of object oriented programming (OOP) and use of COM server</li> </ul>
Objectives	Supports
<ul style="list-style-type: none"> <li>✓ Using of FXServer for the communication with the different components of Flexium</li> </ul>	<p>Training materials</p> <ul style="list-style-type: none"> <li>○ Simulator</li> </ul> <p>Deliveries</p> <ul style="list-style-type: none"> <li>○ Course presentation (printed and .pdf on CD)</li> <li>○ Software Development Kit access</li> <li>○ Programming examples in C# and C++ (on CD)</li> </ul>
Training Content	
<p>Introduction in the architecture of FXServer</p> <p>Explanation of the Flexium components (FXServer, FXLib, FXLog) and configuration file (FXServer.ini)</p> <p>Explanation of the FXServer architecture (Event handling, task management, ...)</p>	<p>Exercises related to practice using C#</p> <ul style="list-style-type: none"> <li>○ Object referencing and instancing of the classes of the development components</li> <li>○ Using of the development components</li> <li>○ Characteristics of the array structure of event classes</li> <li>○ Programming examples</li> </ul> <p>Questions and answers</p>
Duration	Date / Costs
3 days	Please consult your local training contact

# Safety including SAM

**FLTR 463**

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## Your area of interest

Engineering and Setup

---

## Prerequisite

FXTR 102 or FLTR 402

---

## 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

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## Duration

1 day

---

## Date / Costs

Please consult your local training contact

# Safety including NUM-SAMX

**FPTR 463**

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**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

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**Duration**

2 days

---

**Date / Costs**

Please consult your local training contact

# Axium system maintenance

APTR 201

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## Your area of interest

Maintenance

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## Prerequisite

None

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## Objectives

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

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## Supports

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

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## 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

### Your area of interest

---

Something around NUM controls

### Prerequisite

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Depending on the training content

### 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

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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

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- Refer to Course Schedule
- Free of charge

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## Organization / Terms of business

### Training Facilities United States:

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

**Journey / Hotels** Short descriptions of the journey and hotels near to the training site are described on page 36.

**Cost** Contact your local NUM office.

**Time** Classes begin at 08:00 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:

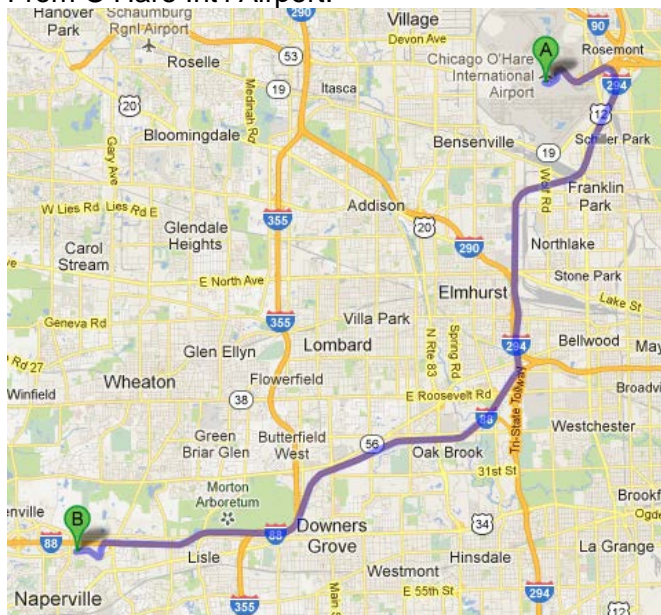
Training date:

Training location:

Names of the participants:

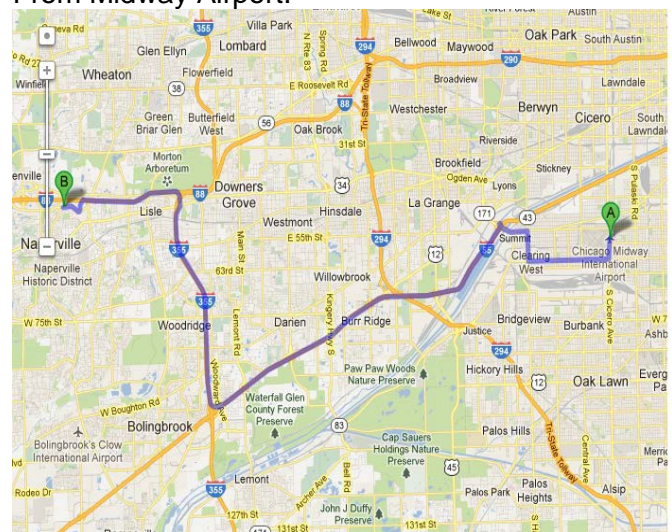
# Journey to NUM USA

## From O'Hare Int'l Airport:



- A Chicago O'Hare International Airport**  
10000 West O'Hare Avenue, Chicago, IL 60666
- Head southeast  
About 2 mins  
go 0.5 mi  
total 0.5 mi
  - Take the ramp onto I-190 E  
About 3 mins  
go 1.5 mi  
total 2.1 mi
  - Take exit 1D toward I-294 S/Indiana/S Tollway  
go 0.4 mi  
total 2.4 mi
  - Merge onto I-294 S  
Partial toll road  
About 11 mins  
go 8.7 mi  
total 11.2 mi
  - Take the Interstate 88 West E-W Tollway exit toward Aurora  
Toll road  
go 0.4 mi  
total 11.6 mi
  - Merge onto I-88 W  
Toll road  
About 15 mins  
go 11.9 mi  
total 23.5 mi
  - Take the exit toward Naperville Road  
go 0.5 mi  
total 23.9 mi
  - Turn left onto Freedom Dr  
About 1 min  
go 0.4 mi  
total 24.3 mi
  - Turn right onto E Diehl Rd  
Destination will be on the left  
About 2 mins  
go 0.7 mi  
total 25.0 mi
- B Num Corporation**  
603 E Diehl Rd, Naperville, IL 60563

## From Midway Airport:



- A Midway International Airport**  
5700 S Cicero Ave, Chicago, IL 60638
- Head south on S Cicero Ave  
About 1 min  
go 0.7 mi  
total 0.7 mi
  - Turn right onto W 63rd St  
About 7 mins  
go 3.0 mi  
total 3.7 mi
  - Turn right onto S Harlem Ave  
About 2 mins  
go 1.0 mi  
total 4.7 mi
  - Turn left onto S Archer Ave  
go 0.7 mi  
total 5.4 mi
  - Continue onto IL-171 N  
go 0.4 mi  
total 5.8 mi
  - Take the I-55 S ramp to St Louis  
go 0.4 mi  
total 6.2 mi
  - Keep left at the fork and merge onto I-55 S  
About 13 mins  
go 12.2 mi  
total 18.4 mi
  - Take exit 269 for Interstate 355 Tollway N/Interstate 355 Tollway S toward Northwest Suburbs/Southwest Suburbs  
Toll road  
go 0.4 mi  
total 18.7 mi
  - Keep right at the fork, follow signs for Interstate 355 N/Northwest Suburbs and merge onto I-355 N  
Toll road  
About 7 mins  
go 6.7 mi  
total 25.4 mi
  - Take the exit toward Aurora  
Toll road  
About 2 mins  
go 1.5 mi  
total 27.0 mi
  - Merge onto I-88 W  
Toll road  
About 3 mins  
go 2.6 mi  
total 29.6 mi
  - Take the exit toward Naperville Road  
go 0.5 mi  
total 30.0 mi
  - Turn left onto Freedom Dr  
About 1 min  
go 0.4 mi  
total 30.4 mi
  - Turn right onto E Diehl Rd  
Destination will be on the left  
About 2 mins  
go 0.7 mi  
total 31.2 mi
- B Num Corporation**  
603 E Diehl Rd, Naperville, IL 60563

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.