

**W-wa, 3.01.2008**

## **Dodatkowe informacje i programy kursów UG/NX5**

Podane ceny ustalone zostały dla pełnej grupy i dlatego mogą ulec zwiększeniu, jeśli na kurs zgłosi się mniej osób niż wymagana liczebność pełnej grupy (12 osób) i zainteresowani mimo to zdecydują się na uczestnictwo w kursie.

Terminy, decyzja o uruchomieniu kursu jak również sposób organizowania zajęć (zajęcia rozłożone na cały semestr lub skondensowane) ustalone będą na zebraniu, o którym mowa w ogłoszeniu i dlatego obecność na zebraniu jest konieczna (możliwe jest wydelegowanie przedstawiciela).

Kursy prowadzone są w języku polskim (możliwa jest wersja angielska przy wystarczającej liczbie chętnych), ale istnieje konieczność podstawowej znajomości języka angielskiego w zakresie typowej terminologii "CAD", ponieważ system UG/NX5 napisany jest w tym języku. Z tego powodu również załączone poniżej programy poszczególnych kursów zredagowane są w języku angielskim.

### **Poniżej w kolejności programy kursów:**

**Kurs nr 1** - CAD-I uzupełniający (30 godzin)

**Kurs nr 2** - CAD-I pełny (45 godz.)

**Kurs nr 3** - "Design Applications Using NX5" (zaawansowany "modelling" - 45 godz.),

**Kurs nr 4** - "Drafting Essentials NX5" (tworzenie dok. technicznej 2D - 45 godz.),

**Kurs nr 5** - "Mechanical Free Form Modelling NX5" (zaawansowane kształtowanie tzw. powierzchni "swobodnych"- 45 godz.),

# Kurs Nr 1.

## CAD-I NX5, uzupełniający

Kurs ten dostępny jest tylko dla studentów posiadających zaliczenie przedmiotu ZSC-I zsemestru zimowego 05/06, w związku z tym jego program jest uzupełnieniem już zdobytych umiejętności do poziomu kursu "CAD-I –pełny". Zakres materiału zawarty w tym programie pokrywa się częściowo z zakresem programu kursu pełnego, ale w przypadku kursu uzupełniającego czas poświęcony na poszczególne tematy będzie zredukowany w zależności od stopnia opanowania materiału przez kursantów.

### Contents

#### **Positional Form Features**

*(Hole, Boss, Positioning Terminology, Positioning Methods, Slot, Pocket, Pad, Additional Positioning Methods, Parameter Entry Options, Groove, Editing the Size and Location of Form Features, Edit Positioning, Error Messages, Editing Features with the Part Navigator, Additional Positioning Techniques), Expressions, Shell, Edge Operations (Edge Blend, Chamfer),*

**Model Construction Query** *(Visually Inspect the Part, Layers, Layer Categories, Part Navigator, Information, Distance, Mass Properties),*

**Introduction to Assemblies** *(Definitions and Descriptions, Introduction to Load Options, Load Method, Load States, Load Failure, The Assembly Navigator, Assembly Navigator Pop-Up Menu Options, Designing in Context, Saving the Work Part),*

**Adding Components & Mating Conditions** *(General Assembly Concepts, Assemblies Application, Assemblies Pull-down Menu, Assemblies Toolbar, Adding Components to an Assembly, Mating Conditions, The Mating Conditions Dialog, Tree Listing, Repositioning Components),*

**Datum Features** *(Datum Planes, Datum Axis, Datum CSYS),*

**Sketching** *(Sketches and the Part Navigator, Sketch Visibility, Creating a New Sketch, The Active Sketch, Sketch Creation Steps, Sketch Curves, Creating Fillets, Trimming and Extending Curves, Sketch Points, Dimensional Constraints, Editing Dimensions, Geometric Constraints, Show/Remove Constraints, Constraint Conditions, Convert To/From Reference),*

**Swept Features and Boolean Operations** *(Types of Swept Features, Extrude, Boolean Operations, Start and End Limit Options, Extrude with Offset, Extrude with Draft, Selection Intent, Sweep Along Guide, Revolve),*

**Editing the Model** *(Accessing the Options to Edit Features, Part Navigator, Deleting Features, Update Failures, Delaying Model Updates, Move Feature, Reattaching Feature),*

**Instance Arrays** *(Rectangular Instance Array, Circular Instance Array),*

**The Master Model** *(The Assembly Modeler, Master Model Example),*

**Introduction to Drafting, Expression Operators** *(Operators, Precedence and Associativity, Legacy Unit Conversion, Built-in Functions),*

**Point Constructor**

**Options** *(Methods to Specify a Point, WCS and Absolute Coordinates, Offset),*

**Customer Defaults** *(Customer Defaults Levels, Setting Customer Defaults, USER GROUP and SITE directories, Managing Your Changes, Updating to a new Release of NX).*

**Duplicating Features** *(Mirror Body, Mirror Feature, Selection Steps, Copy/Paste Feature, Expression Transfer Mode, Other Option),*

**Face Operations** *(Offset Face, Draft), Trim Body, Variable Radius Edge Blends.*

# Kurs Nr 2.

# CAD-I NX5, pełny

## Contents

**Overview** (Course Objectives, Prerequisites, Part File Naming, Seed Parts, Colors, Definitions of Terms), **Getting Started** (Starting NX, Gateway Application, Cue/Status Line, Windows File Dialogs, Opening Multiple Parts, Exiting NX), **The NX User Interface** (Toolbars, Customizing Toolbars, Roles, Mouse Navigation, Mouse Pop-up Menu, Graphics Window View Manipulation, Selecting Objects, Preview Selection and Quick Pick), **Coordinate Systems** (Overview of Coordinate Systems, Manipulating the WCS, Move WCS (Dynamics), Origin Handle, Axis Handles, Rotation Handles), **Introduction to Solid Modeling** ( Primitives, Block, Cylinder, Defining Vectors), **Positional Form Features** (Hole, Boss, Positioning Terminology, Positioning Methods, Slot, Pocket, Pad, Additional Positioning Methods, Parameter Entry Options, Groove, Editing the Size and Location of Form Features, Edit Positioning, Error Messages, Editing Features with the Part Navigator, Additional Positioning Techniques), **Expressions, Shell, Edge Operations** (Edge Blend, Chamfer), **Model Construction Query** (Visually Inspect the Part, Layers, Layer Categories, Part Navigator, Information, Distance, Mass Properties), **Introduction to Assemblies** (Definitions and Descriptions, Introduction to Load Options, Load Method, Load States, Load Failure, The Assembly Navigator, Assembly Navigator Pop-Up Menu Options, Designing in Context, Saving the Work Part), **Adding Components & Mating Conditions** (General Assembly Concepts, Assemblies Application, Assemblies Pull-down Menu, Assemblies Toolbar, Adding Components to an Assembly, Mating Conditions, The Mating Conditions Dialog, Tree Listing, Repositioning Components), **Datum Features** (Datum Planes, Datum Axis, Datum CSYS), **Sketching** (Sketches and the Part Navigator, Sketch Visibility, Creating a New Sketch, The Active Sketch, Sketch Creation Steps, Sketch Curves, Creating Fillets, Trimming and Extending Curves, Sketch Points, Dimensional Constraints, Editing Dimensions, Geometric Constraints, Show/Remove Constraints, Constraint Conditions, Convert To/From Reference), **Swept Features and Boolean Operations** (Types of Swept Features, Extrude, Boolean Operations, Start and End Limit Options, Extrude with Offset, Extrude with Draft, Selection Intent, Sweep Along Guide, Revolve), **Editing the Model** (Accessing the Options to Edit Features, Part Navigator, Deleting Features, Update Failures, Delaying Model Updates, Move Feature , Reattaching Feature), **Instance Arrays** (Rectangular Instance Array, Circular Instance Array), **The Master Model** (The Assembly Modeler, Master Model Example), **Introduction to Drafting, Expression Operators** (Operators, Precedence and Associativity, Legacy Unit Conversion, Built-in Functions), **Point Constructor Options** (Methods to Specify a Point, WCS and Absolute Coordinates, Offset), **Customer Defaults** (Customer Defaults Levels, Setting Customer Defaults, USER GROUP and SITE directories, Managing Your Changes, Updating to a new Release of NX). **Duplicating Features** (Mirror Body, Mirror Feature, Selection Steps, Copy/Paste Feature, Expression Transfer Mode, Other Option), **Face Operations** (Offset Face, Draft), **Trim Body, Variable Radius Edge Blends.**

## Kurs Nr 3.

# Design Applications Using NX5

## Contents

**Constraining Sketches** (*Dimensional Constraints, Geometric Constraints, Show/Remove Constraints, Constraint Conditions, Drag, Create Inferred Constraints, Automatic Constraint Creation, Add Existing Curves to a Sketch, Convert To/From Reference*),

**Constraint Management** (*Alternate Solution, Placing Sketches Where They Are Needed, Reattaching Sketches, Reordering Sketches, Mirroring in a Sketch*), **Additional Sketching Techniques** (*Edit Defining String, Deleting or Suppressing Sketches, Animate*), **Basic Free Form** (*Splines, Creating a Spline, Sketch on Path, V-sweep, Embedded Sketches*),

**Expressions** (*The Expressions Dialog, Expression List, Listed Expressions, Conditional Expressions, Suppression by Expression, Suppress by Expression Dialog Options, Measurements, Creating and Editing Measurements, Measures and Measurements*),

**Duplicating Features** (*Mirror Body, Mirror Feature, Selection Steps, Copy/Paste Feature, Expression Transfer Mode, Other Option*), **Assembly Functions** (*Assemblies Application, Assemblies pull-down menu, The Assembly Navigator, Selecting Components, Pop-Up Menu Options, Drag and Drop in the Assembly Navigator, Specifying Columns, Assembly Navigator Properties, Component Properties, Assembly Property Page, Attributes Property Page, Parameters Property Page, Weight Property Page, Part File Property Page, General Property Page, Check Clearances*),

**Reference Sets** (*General Concepts Concerning Reference Sets, Default Reference Sets, The Model Reference Set, The Lightweight Reference Set, The Simplified Reference Set, User Defined Reference Sets, Creating Reference Sets, Reference Set Information, Replacing Reference Sets, Editing Reference Sets, Deleting Reference Sets, Load Options and Reference Sets, Defining Search Directories*), **Deform Part** (*Defining Deformable Parts, Definition, Features, Expressions, References, Deforming a Component in an Assembly, Editing a Deformed Component*), **Top-Down Assembly Modeling** (*Top-Down Design, Creating a New Component, Verifying the Creation of a New Component, Considerations of Selecting Data During Component Creation, Designing in Context of an Assembly, Sketching in Context, Introduction to Interpart Modeling, Localized Interpart Modeling, Interpart Modeling Applications, Part in Process Modeling, Mold/Die Applications, Editing Links*), **Interpart Expressions**

(*General Concepts, Types of Interpart Expressions, Overriding Expressions, Creating Interpart Expressions, Edit Interpart References, Load Parts, Partial Loading Issues, Tips and Recommended Practices*), **Assembly Arrangements** (*General Concepts, The Assembly Arrangements Dialog, The Properties Dialog, Arrangements Procedure, Arrangements Notes*), **Offset Curves** (*Activity-Capturing Design Intent with Offset Curves*), **Extracting and Simplifying Geometry** (*Extract Geometry, Editing Extracted Geometry, Simplify Body*), **Face Operations** (*Offset Face, Draft*), **Trim Body, Variable Radius Edge Blends, Remember Mating Constraints, Component Arrays** (*Editing a Component Array, Feature-Based Component Arrays*), **Family of Parts** (*Capabilities and General Concepts, Adding Part Family Members to an Assembly, Criteria, Obtaining Information on Family Members*), **Revisions and Substitutions** (*File Versioning/Revisions, Revising a Component and Assembly Using Save As, The Part Modifications Dialog, Additional Assembly Reports, Load Options and Revisioning, Partial Loading Issues, Closing Assembly Component Parts, Reopening Component Parts, Substituting Components, Alternate Mating Conditions, Defining Alternates*), **System Topics**

(*Customer Defaults, Customer Defaults Levels, Setting Customer Defaults, USER, GROUP, and SITE directories, Managing Your Changes, Updating to a New Release of NX, Interpart Modeling, File Versioning, File Versioning Example*), **Expression Operators** (*Operators, Precedence and Associativity, Legacy Unit Conversion, Built-in Functions*), **Variable Positioning** (*Repositioning and Variable Positioning*), **Defining a Family of Parts** (*Part Families Dialog, The Part Family Spreadsheet*).

# Kurs Nr 4.

# Drafting Essentials NX5

## Contents

### Part I

**Course Overview** (*Intended Audience, Prerequisites, Objectives, Classroom Part Files, Class Part File Naming, Layers and Categories, Colors, Seed Part, General Course Information, The Drafting Application, NX Role, Drafting Toolbars, Drafting Icons and Toolbars used in this Course, How to Use This Manual, Workbook Overview, Classroom System Information*), **Part Navigator** (*Drawing Node, Sheet Node, View Node*), **Drawings** (*The Drafting Application, Creating and Adding a New Drawing Sheet, Editing a Drawing, Deleting a Drawing, Opening a Drawing, Drawing Monochrome Display*), **Adding Views to a Drawing** (*View Preferences, Hidden Lines, Smooth Edges, Virtual Intersections, General, Drafting Preferences, Adding a Base View, View Creation Options Bar, Adding Projected Views, Creating a Simple Section, Editing Existing Views, Removing Views From a Drawing, Creating A "Clipboard" Drawing*), **Utility Symbols** (*Creating Utility Symbols, Deleting Utility Symbols, Creating a Linear Centerline, Full Bolt Circle and Partial Bolt Circle, Creating an Offset Center Point, Methods of Creating an Offset Center Point, Other Uses of Offset Center Points, Creating a Cylindrical Centerline*), **Creating Dimensions** (*Annotation Preferences, Dimension Creation, Annotation Placement Toolbar, Editing an Existing Dimension, Editing Specific Aspects of an Existing Dimension, Inheriting Preferences from an Existing Dimension, Placement Cues for Dimensions, Appended Text, Tolerances, Text Orientation and Text Arrow Placement, Reference Dimensions with a Tolerance, Inspection Dimensions*), **Creating Annotation** (*Text Creation, Creating Notes, Entering Text, Creating Leaders on Notes and Labels, The Annotation Editor, Annotation Editor Toolbar Options, Helper Lines, Object-Action Relationship, MB3 Object Specific Options*), **Inherit Feature Data** (*Feature Parameters Dialog, Changing The Default Template, Editing the Origin*), **The Master Model** (*The Master Model Environment, The Master Model Environment for Drafting, The Assembly Application, Adding a Component Part, General Procedure for Master Model Drawing Creation*), **Drawing Templates, Layer Settings, Annotation Preferences** (*Setting Global Annotation Preferences, Editing Existing Annotations with the Annotation Style Dialog, Dimension Text Preferences and Style, Line/Arrow Preferences and Style, Arrowhead Display, Line and Arrow Display Parameters, Extension Line and Arrow Color/Font/Width Options, Lettering Preferences and Style, Alignment Position, Lettering Types, Descriptions of the Lettering Options, Symbol Preferences, Units Preferences, Format and Units, Tolerance Location, Linear Format Units, Angular Format, Dual Dimension Format and Units, Radial Preferences and Style*), **Sectioning Views** (*Creating Section Views, Section View Associativity, Section View Creation Options, Stepped Section Views, Revolved Section View, Half Section View, Half Section Creation Procedure, 3 Dimensional Section View, 3D Section Creation Procedure, Section View Display Preference Options, Fill/Hatch Preferences*), **ID Symbols** (*Creating ID Symbols, Symbol Icons, ID Symbol Leader Types, Create ID Symbol, Editing ID Symbols*), **Creating Custom Views, Updating Views and Editing Section Lines** (*Updating a Drawing, Delay View Update, Editing the Section Line Segments, Editing a Hinge Line*).

### Part II

**GD&T Symbols** (*Creating GD&T Symbols, Additional GD&T Symbols, Creating GD&T Symbols with a Leader, Simple GD&T Symbol Creation, Control Frame Builder, Editing GD&T Symbols*), **Move, Copy, and Align Views** (*Moving Drawing Views, Copy Views, Parent/Child View Relationships, Aligning Drawing Views, View Alignment Methods, Alignment Options, Model Point Alignment Example, View Centers Alignment Example, Point-to-Point Alignment Example*), **Other Dimensioning Options** (*Angular Dimensions, Inferred Dimensions*), **Additional Annotation Editor Options** (*Additional Text Editor Functionality, Drafting Symbols, GD&T Symbols, User Symbols, Appended Text, Editing Dimension Text, Associative Text*), **Detail Views** (*Adding a Detail View, Label on Parent, Setting the Preferences for the Detail View Border*), **View Boundaries** (*Drawing View Boundaries, Associative Objects in a View, Included Points, Anchor Point*), **View Dependent Creation** (*View Dependent Object Creation, Curve Creation, Working inside a Member View, User-Defined, View Boundaries, Break Line/Detail, Boundary Point, View Boundary Construction Lines*), **Broken View Creation** (*Broken Views, Broken View*

*Basic Procedures*), **Break- Out Section Views** (*What Is a Break-Out Section View? Steps for Creating a Break-Out Section View*), **Maintaining Associativity** (*Identifying Associated Objects, Retain Annotations, Editing Dimension Associativity , Drafting Object , Associativity and Symbols, Editing Section Line Associativity*), **Chain & Baseline Dimensions** (*Narrow Dimensions*), **Sectioning Assembly Views** (*Assembly Drawings , Sectioning Views in Assembly Drawings , Assembly Crosshatching*), **Associative Notes and Labels** (*Inserting Expression Values into Notes and Labels , Expression )*), **Auto-Inheriting Sketch Dimensions** (*Bi-directional Associativity , Auto-inheriting Sketch Dimensions*), **View Dependent Edits** (*The Add Edits Icons, The Delete Edits Icons, The Color, Font and Width Options, Convert Dependency, Hidden Line Removal*), **Pictorial Section Views (Optional)** (*Creating a Pictorial Section View from an Ortho View, Creating an Ortho Section View from a Pictorial View*), **Inheriting Tolerance Display Instances (Optional)** (*Geometric Tolerance Features, Display Instances , Auto-Inheriting Tolerance Features , Auto-inheriting Tolerances From a Master Model*), **Render Sets (Optional)** (*Definition of Render Sets, Creation of Render Sets , Application of Render Sets*), **Rendering Threads (Optional)** (*Thread Annotation , Thread Orientation*), **Exploded Views (Optional)** (*The Exploded Views Toolbar , Selecting Components for Explosion , General Information Regarding , Exploded Views, Creating Trace lines*), **Ordinate Dimensions (Optional)** (*Ordinate Dimensions , Defining the Datum Origin , Specifying the Display of the Datum Origin ,Baselines , The Positive Quadrant , Extension Lines )*), **Part Attributes (Optional)**, **Exporting a Drawing** (*New vs. existing, Drawing Selection, Converting a File to a Master Model Format*).

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## **Kurs Nr 5.**

# **Mechanical Free Form Modeling NX5**

## **Contents**

### **Introduction to Mechanical Free Form**

**Developed Curves** (*Splines, Studio Spline Functions, Offset Curve, Bridge Curve, Project, Intersection Curve, Offset In Face, Editing Splines, Framing Data, Trim Curve*),  
**CurveAnalysis, Primary Sheets and Bodies** (*Free Form Features, Primary Free Form Sheets, Tolerances, Ruled Features, Through Curve Mesh Features, Swept Features, Variational Sweep Features*),

**Transitions** (*Section Features, Bridge, Face Blend, Soft Blend, N-Sided Surface, Bounded Plane*),

**Face Analysis** (*Face Analysis, Draft, Geometric Properties, Deviation Checking, Diagnostic Tools*),

### **Working with Sheets** (*Extensions, Law*

*Extension, Enlarge Sheet, Offset Surface, Global Shaping — Variable, Sew, Trim Sheet, Change Edge, Constructing Draft, Trim and Extend*),

**Sheets and Solids** (*Thicken, Sheet to Solid Assistant, Draft with Body Taper, Partings*),

**Divide Curve and Stretch, Using the Law Subfunction, Inputting Points from a File, Splines Perpendicular to Planes,**

**Optional Activities** (*Editing Points on a Spline, Extract Geometry Curve, Join, Extract Isocline Curves, Wrap/Unwrap, Miscellaneous Activities*).

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