

# KUKA



## College

Comprehensive robotics training for all levels.



## Training Catalogue



KUKA Colleges provide seminar students throughout the world with hands-on training, in which they can learn the necessary specialist knowledge and skills at first hand. The modular seminars are tailored to the current practical requirements in each case. The result is well-trained and highly qualified employees in your company.

Training is always an investment – and like all investments should be carefully considered. KUKA offers training courses for everyone that works with robots – from system operators to programmers, and from maintenance personnel to designers of robotic cells and top decision-makers. Moreover, we offer seminars in the context of personnel development. Which means your investment pays off on all levels. Contact [KUKA College](#) directly if you have a need for training on a technology not listed below.

**Click on the [links](#) below for detailed course information:**

## **KUKA Canada – KR C4**

- [Robot Operation 1](#)
- [Robot Operation Pro](#)
- [Robot Programming 1](#)
- [Robot Programming 2](#)
- [Retrain Robot Programming](#)

**Contact KUKA College to be added to our waitlist for the following courses:**

- [Safety Start Up - KUKA.SafeOperation V3.x](#)
- [KUKA.SimPro, SimLayout & OfficeLite](#)
- [Configuration and Programming RoboTeam](#)
- [External Axis Configuration](#)
- [Upgrade System Integrator GI](#)
- [Upgrade Robot Operation and Programming: Transition from KR C2 to KR C4](#)
- [KUKA.ArcTech Robot Operating](#)
- [KUKA.ArcTech for Experienced Robot Operators](#)

## **Additional Courses Available at KUKA USA in Shelby Township, Michigan:**

- [Electrical Servicing – System Technology KR C4, KR C4 Compact, KR C4 smallsize 2](#)
- [Electrical Servicing – Advanced Diagnosis](#)
- [Mechanical Servicing QUANTEC, CYBERTECH](#)
- [Mechanical Servicing AGILUS](#)
- [Update Electrical Servicing – System Technology KR C4 Compact](#)
- [Electrical Servicing – System Technology KR C4 Compact](#)
- [LBR iiwa – Robot Operation Sunrise OS 1](#)
- [LBR iiwa – Commissioning and Programming](#)
- [Upgrade LBR iiwa – Commissioning and Programming for experienced KR C4 experts Sunrise OS](#)
- [LBR iiwa – Safety Start-up and Human-Robot-Collaboration\(HRC\) Programming Sunrise OS 1](#)
- [Electrical Servicing KUKA Sunrise Cabinet](#)
- [Commissioning KUKA Robots KR C4 / KR C4 compact](#)

## **KUKA Canada – KR C4**

- [Custom Workshops](#)

## **KUKA Canada – On-site Option**

- [Customer Site Training – Mobile Training Cells](#)

## **Government Funding for Certified Training**





## Robot Operation 1

### Software Version:

KUKA System Software V8.x (KR C4)

### Target Group:

Operators

### Seminar Goals:

The goal of the seminar is to acquire all the skills required for safe operation of a KUKA robot system.

### Topics Covered:

- Safety when working with KUKA robots
- Recognizing hazards when operating KUKA robots and taking corrective action
- Overview of safety facilities when operating KUKA robots
- Basic knowledge of the structure of a robot system
- Moving the robot manually
- Safe robot retraction, individual axes
- Retracting the robot safely with linear motions
- Starting and executing robot programs manually and in automatic mode
- Selecting and setting the appropriate operating mode
- Performing an initialization run
- Selecting, starting and executing robot programs
- Making preparations for starting the robot program from an external controller
- Executing a program start via an external controller
- Restarting a robot program after an interruption
- Reading and interpreting robot controller messages
- Displaying the current robot position
- Principle of mastering and checking the mastering
- Gripper operation (KUKA.GripperTech)

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes.

### Prerequisites:

This seminar requires no special knowledge and is also suitable for complete novices.

### Length of seminar:

2 days

### Tuition fees:

CAD \$1,030

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Robot Operation PRO

### Software Version:

KUKA System Software V8.x (KR C4)

### Target Group:

Operators, Service Technicians

### Seminar Goals:

The goal of the seminar is to acquire all the skills required for safe operation of a KUKA robot system. The participant learns how to modify and adapt existing or copied robot programs, to read and understand various program commands and how to deal with simple faults.

### Topics Covered:

- Safety when working with KUKA robots
- Basic knowledge of the structure of a robot system
- Moving the robot manually
- Starting and executing robot programs manually and in automatic mode
- Human-machine communication, display and filter the Logbook, display I/O signals, timers, flags, counters
- Using technology packages; gripper programming
- Working with program files, delete, rename, duplicate, archive, restore
- Reading structured programs and program flow charts
- Adapting and modifying robot programs, Point-to-Point, Linear, continuous path motions
- Reading and understanding logic commands in existing programs
- Principle of mastering and checking the mastering

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes.

### Prerequisites:

This seminar requires no special knowledge and is also suitable for complete novices.

### Length of seminar:

4 days

### Tuition fees:

CAD \$2,060

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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## Robot Programming 1

### Software Version:

KUKA System Software V8.x, (KR C4)

### Target Group:

Programmers, Service Technicians, Engineers

### Seminar Goals:

The goal of the seminar is to teach the fundamentals of the programming of a KUKA robot system. The Programming 1 seminar is geared for preparing students for advanced training program seminars

### Topics Covered:

Structure and function of a KUKA robot system

- Overview mechanics of a KUKA robot
- Overview KR C4 robot controller
- Overview KUKA smartPAD
- Robot safety

Moving the robot

- Reading and interpreting robot controller messages
- Selecting and setting the operating mode
- Moving individual robot axes
- Coordinate systems in conjunction with robots
- Moving the robot in the world coordinate system
- Moving the robot in the tool coordinate system
- Moving the robot in the base coordinate system
- Jogging with a stationary tool

Starting up steps at the robot

- Mastering principle
- Mastering the robot
- Loads on the robot
- Tool load data
- Supplementary loads on the robot
- Tool calibration
- Base calibration (workpiece coordinate system)
- Calibration of a stationary tool
- Calibration of a robot-guided workpiece
- Start Up Mode

### Prerequisites:

Vocational training in a technical job. Familiarity with PCs and Windows is helpful

### Length of seminar:

5 days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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## Robot Programming 1

### Topics Covered continued:

#### Executing robot programs

- Performing an initialization run
- Selecting and starting robot programs

#### Working with program files

- Creating program modules
- Editing program modules
- Archiving and restoring robot programs
- Tracking program modifications and changes of state by means of the logfile

#### Creating and modifying programmed motions

- Creating new motion commands
- Creating cycle-time optimized motion (axis motion)
- Creating motion commands
- Modifying motion commands
- Motion programming with external TCP/stationary tool

#### Programming collision detection

- Programming motions with collision detection

#### Using logic functions in the robot program

- Introduction to logic programming
- Programming wait functions
- Programming simple switching functions
- Programming time-distance functions

#### Using technology packages

- Gripper operation with KUKA.GripperTech
- Gripper programming with KUKA.GripperTech
- KUKA.GripperTech configuration

#### Working with variables

- Displaying and modifying variable values
- Displaying robot states

#### Variables and declarations

- Data management in KRL
- Working with simple data types

#### Successful programming in KRL

- Structure and organization of robot programs
- Structuring robot programs
- Linking robot programs

### Prerequisites:

Vocational training in a technical job. Familiarity with PCs and Windows is helpful

### Length of seminar:

5 days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

#### **KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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## Robot Programming 1

### Topics Covered continued:

Using program execution control functions

- Programming conditional statements or branches
- Programming a switch statement
- Programming loops
- Programming wait functions
- Time- dependent wait functions
- Signal- dependent wait functions

Working with a higher-level controller

- Preparation for program start from PLC
- Adapting the PLC interface (Cell.src)

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes

### Prerequisites:

Vocational training in a technical job. Familiarity with PCs and Windows is helpful

### Length of seminar:

5 days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

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### Course dates:

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## Robot Programming 2

### Software Version:

KUKA System Software V8.x (KR C4)

### Target Group:

Programmers, Service Technicians, Engineers

### Seminar Goals:

The aim of the seminar is to build on the basic skills taught previously in the Programming 1 Seminar and to learn KUKA high-level programming language KRL and apply it in structured robot programs.

### Topics Covered:

WorkVisual as a programming environment

- Opening a project with WorkVisual
- Comparing projects with WorkVisual
- Transferring a project to the robot controller (installing)
- Activating a project on the robot controller

Editing KRL programs with WorkVisual

- File handling
- Working with the KRL editor

Structured programming

- Objective of a consistent programming methodology
- Procedures for creating structured robot programs
- Creating a program flowchart

Introduction to Expert level

- Using Expert level

Variables and declarations

- Arrays with KRL
- Structures with KRL
- Enumeration data type ENUM

Subprograms and functions

- Working with local subprograms
- Working with global subprograms
- Transferring parameters to subprograms
- Programming functions
- Working with standard KUKA functions

### Prerequisites:

Seminar: Robot Programming 1

### Length of seminar:

5 days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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## Robot Programming 2

### Topics Covered continued:

Customized messages programming with KRL

- Working with a notification message
- Working with a status message
- Working with an acknowledgement message
- Working with a wait message
- Working with dialogs

Motion programming with KRL

- Programming motions with KRL
- Programming relative motions with KRL
- Calculating or manipulating robot positions

Cycle time measurement by means of timers

Switching functions with KRL

- Programming simple switching functions
- Programming path-related switching functions

Interrupt programming

- Programming interrupt routines

Working with analog signals

- Programming analog inputs
- Programming analog outputs

Using the submit interpreter

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes

### Prerequisites:

Seminar: Robot Programming 1

### Length of seminar:

5 days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

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### Course dates:

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## Retrain Robot Programming

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**  
System Integrators, Robot Programmers of other robot systems (ABB, Fanuc, etc.) with expert knowledge.

**Seminar Goals:**  
After this seminar experienced robot programmers are able to visit other seminars of the KUKA college. This is an intense combination of Programming 1 and 2 with reduced lab time. Students must come with expert knowledge of other systems.

- Topics Covered:**
- Safety when working with KUKA robots
  - Advanced knowledge of the structure of a robot system
  - Executing robot programs manually, in automatic mode and via an external controller
  - Human-machine communication
  - Displaying and configuring the logbook
  - Displaying robot states (signals, timers, cyclical flags, counters)
  - Displaying the current robot position
  - Using technology packages (KUKA.GripperTech)
  - Gripper operation and programming gripper commands with KUKA inline forms
  - Configuration for simple programming of gripper commands
  - Working with program files
  - Creating user-defined program modules
  - Integrating newly created programs into the (configured) PLC interface on the robot side
  - Archiving and restoring robot programs
  - Displaying and adapting saved values (variables)
  - Modifying existing or creating new programmed motions with KUKA macros
  - Moving the robot manually
  - Creating and modifying programmed motions with the aid of KUKA inline forms
  - Programming and applying logical functions in motion programs

Continued on next page...

**Prerequisites:**

- Expert knowledge in programming of industrial robot systems
- General knowledge industrial robots
- Start-up knowledge (mastering, tool and base creation)
- Knowledge about coordinate systems
- Knowledge about robot motions (point to point, linear, circular)
- General knowledge in programming
- Knowledge about cell concepts

**Length of seminar:**  
5 Days

**Tuition fees:**  
CAD \$2,575

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
For current course dates, please contact KUKA College directly.

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## Retrain Robot Programming

### Topics Covered continued:

- Programming wait functions with the aid of KUKA inline forms
- Programming simple switching functions with the aid of KUKA inline forms
- Programming path-related switching functions with the aid of KUKA inline forms
- Performing commissioning tasks on the robot
- Mastering the robot
- Setting up a tool: measuring the geometry and assigning the load data
- Setting up, calibrating and offsetting a workpiece base
- Calibrating a fixed tool / robot-guided workpiece
- Successful programming with KRL (KUKA Robot Language) and WorkVisual
- Workflow of a programming project for robot programs
- Structuring and streamlining robot programs with KRL
- Programming with conditional statements and branches
- Programming with loops and jumps
- Linking robot programs with parameter transfer
- Working with variables
- Programming with important system variables
- Creating and modifying programmed motions in KRL
- Calculating and manipulating robot positions
- Programming relative motions
- Programming geometric offsets for robot positions
- Programming logical functions in KRL
- Programming path-related switching functions (e.g. for adhesive application, welding)
- Path-related calling of subprograms in the program sequence
- Linking robot programs
- Using global and local subprograms
- Program links with parameter transfer
- Programming project: cycle time optimization using the example of a palletizing application

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the course.

### Student requirements:

- Long pants, closed-toed shoes

### Prerequisites:

- Expert knowledge in programming of industrial robot systems
- General knowledge industrial robots
- Start-up knowledge (mastering, tool and base creation)
- Knowledge about coordinate systems
- Knowledge about robot motions (point to point, linear, circular)
- General knowledge in programming
- Knowledge about cell concepts

### Length of seminar:

5 Days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argenta Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

For current course dates, please contact KUKA College directly.

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## Robot Briefing

**Controller Type:**  
KSS 4.x, KSS 5.x (KR C2)

**Target Group:**  
Operators

**Seminar Goals:**  
Goal of the seminar is to get a basic overview how to operate with the KUKA Robot system.

- Topics Covered:**
- Safety instructions
  - Basic system overview and basic terms
  - Basics of the robot operating
  - Overview of the coordinate systems
  - Jogging in axis specific motion and WORLD coordinate system
  - Basic navigator program handling
  - Overview of the robot motions
  - Basics of insert, delete and manipulate points
  - Activate automatic external

**Final assessment:**

- A certificate is issued on successful completion of the achievement test.

**Student requirements:**

- Long pants, closed shoes

**Prerequisites:**  
None

**Length of seminar:**  
1 day

**Tuition fees:**  
CAD \$515

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Robot Operation

### Controller Type:

KSS 4.x, KSS 5.x (KR C2)

### Target Group:

Operators

### Seminar Goals:

Goal of the seminar is to get all acquirements for the save usage of the KUKA robot system.

### Topics Covered:

- Safety instructions
- Operating of the robot system
- Knowledge of the coordinate systems
- Selection and jogging with a suitable coordinate system
- Overview setup (mastering, tools & work pieces)
- To realise a mastering
- Basics of calibrating a work piece
- Usage of the navigator & archiving of programs
- Basics of motion programming
- Insert, delete and manipulate points
- Overview of simple logic programming
- Work with automatic mode

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes

### Prerequisites:

- This seminar requires no special knowledge and is also suitable for complete novices
- Participants who have already completed the seminar "Robot Briefing" can also start with the second day after consultation with KUKA College

### Length of seminar:

3 days without Briefing

4 days with Briefing

### Tuition fees:

CAD \$1,545 – without Briefing

CAD \$2,060 – with Briefing

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5

Mississauga, Ontario

L5N 8G6

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

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## Basic Robot Programming

### Controller Type:

KSS 4.x, KSS 5.x (KR C2)

### Target Group:

Programmers, service technicians

### Seminar Goals:

Goal of the seminar is to get all basic acquirments for the programming of the KUKA robot seminar.

### Topics Covered:

- Safety instruction for the KUKA robots
- Operating of the robot system
- Knowledge and usage of the coordinate systems
- Methods of tool calibration and tool payload
- To realise a mastering
- To realise a calibrating of a work piece
- Usage of the navigator, creating programs and archiving of programs
- Usage of motion programming
- Insert, delete and manipulate points
- Limited position correction
- Usage of logic and gripper programming
- Introduction to the expert level
- Work with automatic mode

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes

### Prerequisites:

None

### Length of seminar:

4 Days

### Tuition fees:

CAD \$2,060

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Advanced Robot Programming

**Controller Type:**  
KSS 4.x, KSS 5.x (KR C2)

**Target Group:**  
Programmers

**Seminar Goals:**  
Goal of the seminar is to learn the first part of the KUKA programming language KRL and to use it in structured programs based on the reached basic acquiresments.

- Topics Covered:**
- Programming methodology
  - Usage of the navigator at expert level
  - Usage of variables & declarations
  - Programming of subprograms and functions
  - Usage of data lists
  - Knowledge of data manipulation
  - Programming of motions in KRL
  - Usage of system variables
  - Usage of control structures (jumps, branches & loops)
  - Configuration of the automatic external interface
  - Knowledge of the submit interpreter

- Final assessment:**
- The course ends with an achievement test.
  - A certificate is issued on successful completion of the achievement test.

- Student requirements:**
- Long pants, closed shoes

**Prerequisites:**  
Seminar: Basic Robot Programming

**Length of seminar:**  
4 Days

**Tuition fees:**  
CAD \$2,060

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
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# Safety Start Up KUKA.SafeOperation V3.x

## Software Version:

KUKA System Software V8.x (KR C4)

KUKA.SafeOperation V3.x

## Target Group:

Robot service technicians, start-up engineer, project engineer, technician responsible for robot safety.

## Seminar Goals:

The participants in this seminar are trained in the fundamentals of proper commissioning, fault diagnosis and troubleshooting for the option SafeOperation.

## Topics Covered:

SafeOperation safety

SafeOperation 3.x overview

- Variants and functions
- Functional principle, designated use and connections
- Safe robot retraction
- User group selection for SafeOperation

Activating SafeOperation functionality

Programming the mastering test

Programming the brake test

Configuring and testing all safety parameters in practice

- Defining safety tools
- Defining a cell area
- Activating the override reduction
- Defining Cartesian monitoring spaces
- Activating reference stop
- Defining axis-specific monitoring spaces
- Defining Cartesian velocity monitoring
- Defining axis-specific velocity monitoring
- Defining standstill monitoring

Creating a safety configuration with WorkVisual

- Importing and exporting a safety configuration
- Deploying a project to the KR C4 controller

Defining the interface to a safety-PLC

Defining system variables for SafeOperation

SafeOperation Diagnosis overview

- Starting diagnostic monitor
- Evaluating operation messages with SafeOperation

## Final assessment:

- A certificate is issued on successful completion of the course.

## Student requirements:

- Long pants, closed toed shoes;

## Prerequisites:

Seminar: Robot Programming 1

## Length of seminar:

3 days

## Tuition fees:

CAD \$1,545

## Time:

8:00 am to 5:00 pm

## Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5

Mississauga, Ontario

L5N 8G6

## Course dates:

For current course dates, please contact KUKA College directly.

## Contact:

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# KUKA.SimPro, SimLayout & OfficeLite

**Controller Type:**

KR C4

**Target Group:**

System Integrators, Sales Personnel, Cell Designers.

**Seminar Goals:**

Creation of extensive layouts with kinematic systems and user-defined components. Offline programming with KUKA.OfficeLite

First day focus is on SimLayout.

Remaining days focus on SimPro and OfficeLite

**Topics Covered:**

- Product overview
- Cell design
- Library structure
- Positioning objects
- Linking objects
- Programming the robot
- Motion programming
- Handling programming (gripping)
- Additional functions
- Measuring and labeling
- Creating 3D PDFs
- Use of base and tool
- Signal connection / signal exchange
- Component creation
- Environment component
- Kinematic systems
- Data processing (CAD import)
- Offline programming
- Connection to KUKA.OfficeLite
- Program modification
- Use of external axes
- Linear axes (KL)
- External kinematic system (turntable)
- Additional functions
- Collision detection
- Simple Python programming

**Final assessment:**

- A certificate is issued on completion of the course.

**Student requirements:**

- Long pants, closed-toed shoes

**Prerequisites:**

Seminar: Robot Programming 1 or  
Seminar: Basic Robot Programming

**Length of seminar:**

4 Days

**Tuition fees:**

CAD \$2,060

**Time:**

8:00 am to 5:00 pm

**Location:**

**KUKA Robotics Canada**

2865 Argenta Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**

For current course dates, please  
contact KUKA College directly.

**Contact:**

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Configuration and Programming RoboTeam

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**

Robot programmer and service technician who is responsible for commissioning and programming the technology KUKA.RoboTeam

**Seminar Goals:**

Aim of the seminar is to get all necessary acquirments for the commissioning and programming of the technology KUKA.RoboTeam.

**Topics Covered:**

- Safety instructions for KUKA industrial robots
- Overview of necessary hard- and software
- Establishing network connections between the involved robots
- Configuration of KUKA.RoboTeam using WorkVisual
- Performing a rootpoint measurment of RoboTeam participants
- Establishing a geometric coupling between RoboTeam participants
- Calibrating an offset base coordinate system
- Usage of the RoboTeam PlugIn
- Usage of RoboTeam workspaces
- Program synchronisation (ProgSync)
- Chronological synchronisation of motions (MotionSync)
- Load sharing (direct geometric coupling)
- Process dependent mode (indirect geometric coupling)
- Programming remote access to programs of other robots
- RoboTeam expert programming (RemoteCmd, RemoteRead)

**Final assessment:**

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

**Student requirements:**

- Long pants, closed-toed shoes

**Prerequisites:**

Seminar: Robot Operation PRO or  
Seminar: Robot Programming 1

**Length of seminar:**

2 Days

**Tuition fees:**

CAD \$1,030

**Time:**

8:00 am to 5:00 pm

**Location:**

**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**

For current course dates, please contact KUKA College directly.

**Contact:**

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## External Axis Configuration

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**  
System integrator, commissioning personnel and robot programmers.

**Seminar Goals:**  
Goal of the seminar is to get all acquiresments for the set-up and configuration of external axes. The creation of process parameter in WorkVisual and the programming at the robot will be trained. Thereby the 2-axis positioner an linear track will be used.

**Topics Covered:**

- Introduction external axes and kinematics
- Definition external axes and kinematics
- Usage of external axes in application
- Jogging of external axes and kinematics
- Commissioning of external axes and kinematics
- Mastering of robot and external axes
- Measuring of the kinematics root point
- Measuring of the kinematics offset
- Programming of external axes
- Description of synchronized and asynchronized movements
- Programming of synchronized movements
- Programming of asynchronized, coordinated movements
- Programming of asynchronized, uncoordinated movements
- Description of the cabinet with optional accessories
- Familiarization with the cabinet variants
- Familiarization with internal bus systems of the KR C4
- Working with WorkVisual
- Managing of WorkVisual projects
- Transferring and activation of projects to the controller
- Add catalog elements to an existing project
- Integrate a DKP400.1 with a catalog element
- Integrate a KL250-3 with a catalog element
- Configuration of the KCB - KUKA Controller Bus with WorkVisual
- Example configurations of external axes

**Prerequisites:**  
Seminar: Robot Programming 1

**Length of seminar:**  
5 Days

**Tuition fees:**  
CAD \$2,575

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
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## External Axis Configuration

### Topics Covered continued:

- Assign KCB specific FSoE addresses with WorkVisual
- Determination of FSoE addresses in the KCB
- Changing FSoE addresses in the KCB
- System safety
- Configuration of system safety
- Software module Safe Single Brake
- Interfaces to a higher-level controller
- Planning and selection of hardware for a external axes site
- Examples of motor and RDC boxes
- Interfaces on the connector panel
- KUKA motors
- Standard motor - gear combinations
- Work with WorkVisual Trace
- Trace configuration with WorkVisual
- Start and show trace recording
- Work with the catalog editor
- Familiarization with the catalog editor
- Create an own catalog element
- Configuration of a kinematic with KUKA MGU or KUKA motor

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed-toed shoes

### Prerequisites:

Seminar: Robot Programming 1

### Length of seminar:

5 Days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Upgrade Systems Integrator GI

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**  
System Integrators GI, Commissioning Engineers GI.

**Seminar Goals:**  
System integrators who have ample experience with the integration of robot systems are able to transfer their knowledge within a short time into the KR C4 environment with the focus on commissioning KR C4 systems. The topics covered on the first seminar day enable system integrators who have good skills in commissioning robots and fieldbus systems, but not with KUKA robots, to acquire the necessary skills to successfully follow the following 4 seminar days. No programming topics will be covered during this seminar. Please note: this course is specially tailored to the needs of experienced robot system integrators and definitely not suitable for beginners in the robot business! In this case we suggest to choose our subject specific courses. Please do not hesitate to contact us if unsure which course to choose.

**Topics Covered:**

- Introduction into the operation of a KR C4 system, mastering and tool calibration
- Overview: Hard- and software KR C4
- Basic network skills for KR C4
- Overview: Interface structure KR C4
- Differences KUKA SmartPad and KUKA KCP
- KR C System Recovery
- Differences KUKA.SafeOperation 2.x and 3.x
- Configuration KUKA.SafeRangeMonitoring
- Commissioning PROFINET using KUKA.WorkVisual
- KUKA.WorkVisual for commissioning purposes: ProfiBus-Master via Gateway

**Final assessment:**

- The course ends with an achievement test.
- A certificate is issued on successful completion of the course.

**Student requirements:**

- Long pants, closed-toed shoes

**Prerequisites:**

- Experience in commissioning and configuration of robot systems
- Experience in commissioning of ProfiBus
- Recommended: Seminar "Basic Robot Programming" (KR C2)
- Recommended: Seminar "Advanced Robot Programming"
- Recommended: Seminar "FBT ProfiBus"
- Recommended: Seminar "Safety-Start Up KUKA.SafeOperation 2.x"

**Length of seminar:**  
5 Days

**Tuition fees:**  
CAD \$2,575

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Upgrade Robot Operation and Programming: Transition from KR C2 to KR C4

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**  
Operators, setup personnel, robot programmers

**Seminar Goals:**  
The goal of this seminar is to transfer the existing robot programming and/or operating skills of the participants into the KR C4 environment.

- Topics Covered:**
- Safety when working with KUKA robots in a KUKA college
  - Overview hard- and software structure KR C4
  - SmartPad control elements
  - GUI differences KSS 4.x , 5.x – KSS 8.x
  - Hand-jogging the robot
  - Starting and executing robot programs manually and in automatic mode
  - Reading structured programs and program flowcharts
  - Introduction into the KRL-editor integrated in WorkVisual
  - Working with program files
  - Mastering using EMD
  - Linking new programs with the cell.src

**Final assessment:**

- A certificate is issued on completion of the course.

**Student requirements:**

- Long pants, closed-toed shoes

**Prerequisites:**  
Seminar: Robot Operation KR C2 or  
Seminar: Basic Robot Programming  
KR C2

**Length of seminar:**  
1 Day

**Tuition fees:**  
CAD \$515

**Time:**  
8:00 am to 5:00 pm

**Location:**  
**KUKA Robotics Canada**  
2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**  
For current course dates, please  
contact KUKA College directly.

**Contact:**  
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## KUKA.ArcTech Robot Operating

### Controller Type:

KR C4, KSS V8.x

### Target Group:

Programmers, Engineers, Robot operators with the application arc welding with KUKA.ArcTech

### Seminar Goals:

Goal of the seminar is to change and modify existing robot programs or create new robot weld programs with KUKA.ArcTech. Robot welding with 1 robot is covered in this course.

### Topics Covered:

- Safety when working with KUKA robots
- Recognizing and avoiding hazards when operating robots
- Overview of safety facilities of KUKA robots
- Structure and components of a robot system
- Jogging the robot manually
- Axis-specific jogging
- Cartesian jogging
- Human-machine communication
- Displaying robot states (signals, timers, cyclical flags, counters)
- Reading and interpreting robot controller messages
- Displaying the current robot position
- Executing robot programs manually, in automatic mode and via an external controller
- Selecting and setting the operating mode
- Selecting the robot program
- Performing an initialization run
- Starting and executing robot programs
- Executing a program start via a PLC
- Working with program files
- Creating, deleting, renaming, duplicating robot programs and files of various types
- Archiving and restoring robot programs
- Creating new program modules
- Structuring and streamlining robot programs by using global subprograms

### Prerequisites:

- Technical and programming aptitude.
- At least 1 year practical experience in arc welding.

### Length of seminar:

5 Days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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### Contact:

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## KUKA.ArcTech Robot Operating

### Topics Covered continued:

- Linking robot programs
- Integrating newly created programs into the (configured) PLC interface on the robot controller
- Creating and modifying robot weld- and motion programs
- Programming and changing robot motions by using KUKA inline forms
- Adapting existing welding seams
- Creating new welding seams using KUKA.ArcTech-commands
- Welding with LIN and CIRC motions
- Welding with SPLINE-motions
- Performing commissioning tasks at the robot
- Defining the geometry of a tool
- Assigning tool load data
- Assigning supplementary load data
- Setting up, calibrating and offsetting a work-piece base
- Troubleshooting

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed-toed shoes

### Prerequisites:

- Technical and programming aptitude.
- At least 1 year practical experience in arc welding.

### Length of seminar:

5 Days

### Tuition fees:

CAD \$2,575

### Time:

8:00 am to 5:00 pm

### Location:

**KUKA Robotics Canada**

2865 Argentia Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

### Course dates:

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### Contact:

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## KUKA.ArcTech for Experienced Robot Operators

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**

Programmers, Engineers, Robot operators with the application arc welding with KUKA.ArcTech and previous experience in the operation of KUKA robots certified by a KUKA College certificate.

**Seminar Goals:**

Goal of the seminar is to change and modify existing robot programs or create new robot weld programs with KUKA.ArcTech building on previous KUKA robot operating experience. Creating robot welding programs with 1 robot is covered in this course as well as working with a 2-axis positioner.

**Topics covered:**

- Jogging the robot manually
- Jogging of 2-axis positioners
- Jogging RoboTeam robots
- Creating and modifying robot weld- and motion programs
- Adapting existing welding seams
- Creating new welding seams using KUKA.ArcTech commands
- Welding with LIN and CIRC motions
- Welding with SPLINE motions
- Coupling of 1 or 2 robots to a positioner
- Performing commissioning tasks at the robot
- Defining the geometry of a tool
- Assigning tool load data
- Assigning supplementary load data
- Setting up, calibrating and offsetting a work-piece base
- Optional course content:
- Troubleshooting
- ArcSense,
- TouchSense,
- Configuring ArcTech with Work Visual (including I/O with power supply)
- Calibration of the positioner for mathematical coupling

**Final assessment:**

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

**Student requirements:**

- Long pants, closed-toed shoes

**Prerequisites:**

- Seminar: Robot Operation PRO or Seminar: Robot Programming 1.
- At least 1 year practical experience in arc welding

**Length of seminar:**

3 Days

**Tuition fees:**

CAD \$1,545

**Time:**

8:00 am to 5:00 pm

**Location:**

**KUKA Robotics Canada**  
2865 Argenta Road, Unit 4&5  
Mississauga, Ontario  
L5N 8G6

**Course dates:**

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**Contact:**

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## Electrical Servicing – System Technology KR C4, KR C4 compact, KR C4 smallsize 2

### Controller Type:

KR C4, KR C4 compact, KR C4 smallsize 2

### Target Group:

Robot Service Technicians

### Seminar Goals:

The participants in this seminar are trained in the fundamentals of correct fault diagnosis and troubleshooting for the electrical equipment of the robot system KR C4.

### Topics Covered:

- Safety when working with KUKA training robots
- Recognizing and avoiding hazards when handling electrical components of the KR C4
- Avoiding hazards when handling electrostatic sensitive devices (ESD) of the KR C4
- Structure and function of a KUKA robot system
- Overview of the mechanical system of a KUKA robot
- Overview of the KR C4 robot controller
- Overview of the smartPAD
- Robot safety
- Moving the robot
- Reading and interpreting robot controller messages
- Selecting and setting the operating mode
- Moving robot axes individually
- Coordinate systems in connection with robots
- Moving the robot in the world coordinate system
- Start-up tasks on the robot
- Principle of mastering
- Performing robot mastering
- Executing robot programs
- Performing an initialization run
- Selecting and starting robot programs
- Creating and modifying programmed motions
- Creating new motion commands
- Creating cycle-time optimized motions (axis motions)
- Basic knowledge of the structure of KR C4-based controllers
- Technical data and control concept
- Familiarization with KR C4 bus systems

- Continued on next page...

### Prerequisites:

- Qualified Technician
- Electrical background

### Length of seminar:

4 days

Add on 1 day **Electrical Servicing – Advanced Diagnosis** for 5 course days

### Tuition fees:

USD \$2,060 – without Briefing

USD \$2,575 – with Briefing

### Time:

8:00 am to 4:00 pm

### Location:

**KUKA Robotics Corporation**

51870 Shelby Parkway  
Shelby Township, Michigan  
48315

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Electrical Servicing – System Technology KR C4, KR C4 compact, KR C4 smallsize 2

### Topics Covered Continued:

- Structure of the interface panel
- Cabinet cooling and saving energy
- Restoring and backing up images
- Basic knowledge of the structure of a KR C4 control computer
- Replacing the control PC correctly
- Replacing the individual PC components
- Overview and functional principle of the different KR C4 bus systems
- Exchanging drive components on the KUKA Controller Bus
- Interfacing capability of the KR C4 controller using the \*KUKA Extension Bus and the KUKA Line Interface
- Familiarization with the basic principle of the EtherCAT internal field bus system
- Passive components of the KR C4
- Understanding the functional principle
- Exchanging components
- KR C4 safety concept
- Safety via Ethernet-based field bus systems
- Safety via conventional interfaces X11 and X13
- Practical troubleshooting
- Using the diagnostic monitor and DiagnoseSafety
- Interpreting the diagnostic LEDs
- Starting KRCDiag
- Starting predefined trace configurations
- Familiarization with the differences between control cabinets
- KR C4 North America and midsize
- KR C4 extended
- KR C4 compact
- KR C4 smallsize 2
- Maintenance tables and maintenance intervals
- Practical performance of maintenance on the controller

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes, cotton shirt, no shorts, no sandals

### Contact:

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## Electrical Servicing – Advanced Diagnosis

### Controller Type:

KR C4, KR C4 compact, KR C4 smallsize 2

### Target Group:

Robot Service Technicians

### Seminar Goals:

The participants in this seminar are trained in general and system-specific fundamentals of network technology. The focus is on advanced fault diagnosis using WorkVisual and trace recording.

### Topics Covered:

- Safety when working with KUKA training robots
- Safety when working with KUKA training robots
- Recognizing and avoiding hazards when handling electrical components of the KR C4
- Starting up the robot
- Loads on the robot and tool
- Tool calibration
- Moving the robot in the tool coordinate system
- Basic knowledge of networks
- Familiarization with various network components
- Selecting and assigning IP addresses and subnet masks
- Configuring the KUKA Line Interface
- Remote Desktop - establishing a connection to the KR C4 controller
- Basic principles of the Ethernet-based field buses of the KR C4
- WorkVisual fundamentals and project management
- Downloading and comparing projects and transferring them to the controller
- WorkVisual diagnosis
- Online system information
- Carrying out diagnosis with WorkVisual
- Targeted trace functionality for fault diagnosis

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Prerequisites:

- Qualified Technician
- Seminar: Electrical Servicing Technology KR C4, KR C4 compact, KR C4 smallsize 2

### Length of seminar:

1 day

This is an add-on course to **Electrical Servicing – System Technology KR C4, KR C4 compact, KR C4 smallsize 2**

### Tuition fees:

USD \$515

### Time:

8:00 am to 4:00 pm

### Location:

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

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## Mechanical Servicing QUANTEC, CYBERTECH

### Robot Type:

Quantec (KR210 R2700 Extra), Cybertech

### Target Group:

Robot Service Technicians

### Seminar Goals:

The Mechanical Servicing Seminar is designed for personnel responsible for the maintenance and repair of KUKA robot arms. The participants in this seminar are trained in the fundamentals of proper maintenance and repair work for robot arms of the KR series.

### Topics Covered:

- Proper use of the safety facilities for KUKA industrial robots
- Operating the robot controller to the extent necessary for putting the robot back into service
- Creating test programs
- Recommissioning a robot (installation, connection, start-up, mastering)
- Jogging
- Mode of operation of the individual components of the robot arm
- Repair instructions and spare parts catalog
- Locating the possible cause of mechanical faults
- Correcting mechanical faults by replacing components
- Replacing components using the proper robot dismantling and assembly procedures
- Preventive maintenance and servicing work
- Load data determination

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, safety shoes (steel toes), long hair tied up, no shorts, no sandals.

### Prerequisites:

- Training in a mechanical trade is useful

### Length of seminar:

4 Days

### Tuition fees:

USD \$2,060

### Time:

8:00 am to 4:00 pm

### Location:

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

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# Mechanical Servicing AGILUS

## Robot Type:

KR AGILUS

## Target Group:

Operators, Service Technicians

## Seminar Goals:

The participants in this seminar are trained in the fundamentals of proper commissioning, maintenance and troubleshooting for the mechanical components of the KUKA AGILUS Series (five and six).

## Topics Covered:

- Proper use of the safety facilities for KUKA industrial robots
- Operating the robot controller to the extent necessary for putting the robot back into service
- Creating test programs
- Jogging
- Recommissioning a robot (installation, connection, start-up, mastering)
- Mode of operation of the individual components of the robot arm
- Repair instructions and spare parts catalog
- Locating the possible cause of mechanical faults
- Correcting mechanical faults by replacing components
- Replacing components using the proper robot dismantling and assembly procedures
- Load data for robot tools
- Preventive maintenance and servicing work

## Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

## Student requirements:

- Long pants, safety shoes (steel toes), no shorts, no sandals

## Prerequisites:

- Training in a mechanical trade is useful.
- Safety footwear is a prerequisite for all course participants

## Length of seminar:

4 days

Add on 1 day **Update Electrical Servicing KR C4 compact** for 5 course days

## Tuition fees:

USD \$2,060 – without Briefing

USD \$2,575 – with Briefing

## Time:

8:00 am to 4:00 pm

## Location:

**KUKA Robotics Corporation**

51870 Shelby Parkway

Shelby Township, Michigan

48315

## Course dates:

For current course dates, please contact KUKA College directly.

## Contact:

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# Update Electrical Servicing - System Technology KR C4 Compact

## Robot Type:

KR C4 compact (Agilus)

## Target Group:

Robot Service Technicians

## Seminar Goals:

The participants in this seminar are trained in the fundamentals of proper fault diagnosis and troubleshooting for the electrical equipment of the robot system KR C4 compact including the necessary network basics for recommissioning a KR C4 compact system after repair work

## Topics Covered:

- Safety when working with KUKA training robots
- Recognizing and avoiding hazards when handling electrical components of the KR C4 compact
- Avoiding hazards when handling ESD components of the KR C4 compact
- Basic knowledge of the structure of a KR C4 compact controller
- Technical data and control concept
- Interfaces
- Overview of the bus systems of the KR C4 compact controller
- Interfacing capability of the KR C4 controller using the KUKA Controller Bus and the KUKA System Bus
- Interfacing capability of the KR C4 controller using the KUKA Extension Bus and the KUKA Line Interface
- Basic knowledge of the structure of the KR C4 compact control box
- Exchanging the control PC properly
- Exchanging the individual PC components
- Basic knowledge of the structure of the KR C4 compact drive box
- Exchanging of the complete drive-box properly
- Exchanging the individual drive-box components
- Basic knowledge of the structure of the resolver digital converter (RDC)

## Prerequisites:

- Electrical specialist
- Seminar Electrical Servicing KR C4 System Technology

## Length of seminar:

1 day

This course is a 1 day add-on to

**Mechanical Servicing AGILUS.**

## Tuition fees:

USD \$515

## Time:

8:00 am to 4:00 pm

## Location:

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

## Course dates:

For current course dates, please contact KUKA College directly.

## Contact:

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Continued on next page...



## Update Electrical Servicing - System Technology KR C4 Compact

### Topics Covered continued:

- Exchanging of the RDC properly
- Exchanging of the Electronic Data Storage (EDS) properly
- Familiarization with options of KR C4 compact
- Familiarization with external axis
- Familiarization with bus systems
- Familiarization with I/O Interface
- Safety concept of the KR C4 compact
- Safety by means of ProfiSAFE or the Safety Interface Board
- Safety function via CCUsr
- Diagnostic options and troubleshooting directly at the controller
- Reading block diagrams, wiring diagrams and circuit diagrams
- Practical troubleshooting using circuit diagrams, KRCDiag and diagnostic monitor
- Maintenance table and maintenance intervals
- Practical performance of maintenance on the controller
- Cleaning robot controller KR C4 compact

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes, cotton shirt, no shorts, no sandals

### Contact:

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College Coordinator  
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## Electrical Servicing - System Technology KR C4 Compact

### Robot Type:

KR C4 compact (Agilus)

### Target Group:

Robot Service Technicians

### Seminar Goals:

The participants in this seminar are trained in the fundamentals of proper fault diagnosis and troubleshooting for the electrical equipment of the robot system KR C4 compact including the necessary network basics for recommissioning a KR C4 compact system after repair work

### Topics Covered:

- Safety when working with KUKA training robots
- Recognizing and avoiding hazards when handling electrical components of the KR C4 compact
- Avoiding hazards when handling ESD components of the KR C4 compact
- Basic knowledge of the structure of a KR C4 compact controller
- Technical data and control concept
- Interfaces
- Overview of the bus systems of the KR C4 compact controller
- Interfacing capability of the KR C4 compact controller using the KUKA Controller Bus and the KUKA System Bus
- Interfacing capability of the KR C4 compact controller using the KUKA Extension Bus and the KUKA Line Interface
- Basic knowledge of the structure of the KR C4 compact control box
- Exchanging the control PC properly
- Exchanging the individual PC components
- Basic knowledge of the structure of the KR C4 compact drive box
- Exchanging of the complete drive box properly
- Exchanging the individual drive box components
- Basic knowledge of the structure of the resolver digital converter (RDC)
- Exchanging of the RDC properly

Continued on next page...

### Prerequisites:

- Electrical background
- Robot Operator PRO or Robot Programming 1
- **OR 1 Day Robot Briefing on the Monday before class start on Tuesday.**

### Length of seminar:

4 days without Briefing  
5 days with Briefing

### Tuition fees:

USD \$2,060 – without Briefing  
USD \$2,575 – with Briefing

### Time:

8:00 am to 4:00 pm

### Location:

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

### Course dates:

For current course dates, please contact KUKA College directly.

### Contact:

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Electrical Servicing - System Technology KR C4 Compact

### Topics Covered continued:

- Exchanging of the Electronic Data Storage (EDS) properly
- Basic knowledge of networks
- Familiarization with various network components
- Selecting and assigning IP addresses and subnet masks
- Configuring the KUKA Line Interface
- Establishing a remote desktop connection to the KR C4 compact controller
- Basic principles of Ethernet-based field buses of the KR C4 compact
- Familiarization with options of KR C4 compact
- Familiarization with bus systems
- Familiarization with I/O Interfaces
- Safety concept of the KR C4 compact
- Safety by means of ProfiSAFE or the Safety Interface Board
- Safety function via CCUs
- Software concept and data handling
- Familiarization with KRC System Recovery
- Installing software by means of KRC System Recovery
- Data archiving by means of images
- Diagnostic options and troubleshooting directly at the controller
- Reading block diagrams, wiring diagrams and circuit diagrams
- Practical troubleshooting using circuit diagrams, KRCDiag and diagnostic monitor
- Trace function for troubleshooting
- Configuring, recording and analyzing traces
- Overview of WorkVisual and its potential use for diagnosis
- Downloading and comparing projects, transferring them to the controller
- Performing diagnosis using WorkVisual
- Recording a trace using WorkVisual
- Preview of other potential applications of WorkVisual
- Maintenance table and maintenance intervals
- Practical performance of maintenance on the controller
- Cleaning robot controller KR C4 compact

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes, cotton shirt, no shorts, no sandals

### Contact:

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College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## LBR iiwa - Robot Operation Sunrise OS 1

**Software Version:**  
Sunrise OS

**Target Group:**  
Robot operators.

**Seminar Goals:**  
Goal of the seminar is to acquire the necessary knowledge for handling, modification of existing robot applications and understanding of system and robot messages at the KUKA LBR iiwa robot station.

**Topics Covered:**

- Safe interaction with the KUKA LBR iiwa robot station
- Overview of the safety installation of the KUKA LBR iiwa robot station
- Basic knowledge of the KUKA LBR iiwa robot station hardware installation
  - Overview hard- and software
  - Principles of mastering and referencing
- Moving the robot manually
  - Jogging of robot axes
  - Jogging the robot by using linear movements
  - Jogging the robot with zero space motion
  - Repositioning the robot by using frames
- Starting and running robot applications
  - Selecting the operating mode
  - Selecting and running robot applications
- Human-machine communication
  - Recognizing and understanding robot messages
  - Reading and changing of process data
  - Checking and setting of input- and output signals
  - Reading the current robot position
- Robot technology basics
  - Basic knowledge of Cartesian coordinate systems
  - Understanding the movement types of robots
- Changing a robot application
  - Changing a robot position

**Final assessment:**

- The course ends with an achievement test
- A certificate is issued on completion of the course.

**Student requirements:**

- Long pants, closed-toed shoes, not shorts, no sandals

**Prerequisites:**

- none

**Length of seminar:**

2 Days

**Tuition fees:**

USD \$1,030

**Time:**

8:00 am to 4:00 pm

**Location:**

**KUKA Robotics Corporation**

51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**

For current course dates, please contact KUKA College directly.

**Contact:**

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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## LBR iiwa – Commissioning and Programming

**Software Version:**  
Sunrise OS

**Target Group:**  
Software Engineers, system integrators and programmers.

**Seminar Goals:**  
Goal of the seminar is to acquire the knowledge necessary for commissioning, operating and programming the KUKA LBR iiwa robot station including basic LBR iiwa specific JAVA skills.

- Topics Covered:**
- LBR iiwa specific JAVA Basics
    - Basics of object oriented programming
    - Basic JAVA programming
  - Safe interaction with the KUKA LBR iiwa robot station
  - Overview of the safety installation of the KUKA LBR iiwa robot station
  - Basic knowledge of the KUKA LBR iiwa robot station hardware
    - Overview hard- and software
    - Principles of mastering and referencing
  - Moving the robot manually
  - Selecting and running of robot applications
  - Human-machine-communication
    - Recognizing and understanding robot messages
    - Requesting and changing of process data
    - Checking and setting of input and output signals
    - Reading the current robot position
  - Commissioning of the LBR iiwa robot station
    - Mastering and referencing of the robot
    - Loads and geometry of tools and workpieces
    - EtherCAT I/O-Configuration with KUKA.WorkVisual
  - Safety of the LBR iiwa robot station
    - Safety concept basics
    - Set the necessary safety parameters for the robot station

Continued on next page...

**Prerequisites:**

- Min. 3 years of relevant vocational training
  - Experience in JAVA or any object oriented programming language would be helpful.
- ❖ A laptop pc with recommended specifications: Pentium IV processor, 2500 MHZ, 2 GB RAM, Windows 7 (32 bit or 64 bit) or WinXP (32 bit only, SP3 min) for use with the Sunrise. Workbench and Work Visual.

**Length of seminar:**  
10 Days

**Tuition fees:**  
USD \$5,145

**Time:**  
8:00 am to 4:00 pm

**Location:**  
**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## LBR iiwa – Commissioning and Programming

### Topics Covered continued:

- Successfully programming of the LBR iiwa robot station
  - Handling the IDE "Sunrise Workbench"
  - Generating and using projects and applications
  - Synchronizing of projects and applications
  - Creating and using of application and object data like tools and workpieces
  - Linking application and object data to programs
  - Linking robot applications and methods
  - Using control functions
  - Programming input and output signals
- Programming motions
  - Creating, changing, parameterizing PTP, LIN and CIRC motions
  - Creating, changing, parameterizing SPLINE motions
- Overview of the robotics API library
- Programming path related functions
  - Programming trigger functions
  - Programming torque and force related abortion functions
  - Transformation of frames
  - Creating and using the impedance controller
  - Getting actual torques and forces of the robot via program
  - Programming search and touch functions with torque and force patterns
- Program debugging

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the course.

### Student requirements:

- Long pants, closed-toed shoes, no shorts, no sandals

### Contact:

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College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
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## Upgrade LBR iiwa - Commissioning and Programming for experienced KR C4 experts Sunrise OS

**Software Version:**  
Sunrise OS

**Target Group:**

Start-up specialists with min. 2 years of commissioning of KR C4 based robot systems.

**Seminar Goals:**

Goal of the seminar is to acquire the knowledge necessary for commissioning, operating and programming the KUKA LBR iiwa robot station including basic LBR iiwa specific JAVA skills.

**Topics Covered:**

- LBR iiwa specific JAVA Basics
  - Basics of object oriented programming
  - Basic JAVA programming
- Safe interaction with the KUKA LBR iiwa robot station
- Overview of the safety installation of the KUKA LBR iiwa robot station
- Basic knowledge of the KUKA LBR iiwa robot station hardware
  - Overview hard- and software
  - Principles of mastering and referencing
- Moving the robot manually
- Selecting and running of robot applications
- Human-machine-communication
  - Recognizing and understanding robot messages
  - Requesting and changing of process data
  - Checking and setting of input and output signals
  - Reading the current robot position
- Commissioning of the LBR iiwa robot station
  - Mastering and referencing of the robot
  - Loads and geometry of tools and workpieces
  - EtherCAT I/O-Configuration with KUKA.WorkVisual
- Safety of the LBR iiwa robot station
  - Safety concept basics
  - Set the necessary safety parameters for the robot station

Continued on next page...

**Prerequisites:**

- seminar: Robot Programming 2 KSS 8.x (KR C4)
- seminar: Fieldbus Technology ProfiNet OR seminar Fieldbus Technology EthernetIP"
- Startup and configuration experience of KR C4/KR C4 compact based robot systems
- Experience in the configuration of Ethernet based fieldbus systems with KUKA.WorkVisual
- Basic knowledge in JAVA or other object oriented programming languages e.g. C #.
- ❖ A laptop pc with recommended specifications: Pentium IV processor, 2500 MHZ, 2 GB RAM, Windows 7 (32 bit or 64 bit) or WinXP (32 bit only, SP3 min) for use with the Sunrise. Workbench and Work Visual.

**Length of seminar:**

5 Days

**Tuition fees:**

USD \$2,575

**Time:**

8:00 am to 4:00 pm

**Location:**

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**

For current course dates, please contact KUKA College directly.



## Upgrade LBR iiwa - Commissioning and Programming for experienced KR C4 experts Sunrise OS

### Topics Covered continued:

- Successfully programming of the LBR iiwa robot station
  - Handling the IDE "Sunrise Workbench"
  - Generating and using projects and applications
  - Synchronizing of projects and applications
  - Creating and using of application and object data like tools and workpieces
  - Linking application and object data to programs
  - Linking robot applications and methods
  - Using control functions
  - Programming input and output signals
- Programming motions
  - Creating, changing, parameterizing PTP, LIN and CIRC motions
  - Creating, changing, parameterizing SPLINE motions
- Overview of the robotics API library
- Programming path related functions
  - Programming trigger functions
  - Programming torque and force related abortion functions
  - Transformation of frames
  - Creating and using the impedance controller
  - Getting actual torques and forces of the robot via program
  - Programming search and touch functions with torque and force patterns
- Program debugging

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the course.

### Student requirements:

- Long pants, closed-toed shoes, no shorts, no sandals

### Contact:

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## LBR iiwa - Safety Start-up and Human-Robot-Collaboration (HRC) Programming Sunrise OS 1

**Software Version:**  
Sunrise OS

**Target Group:**

System integrator, Start-up engineers, Safety start-up engineers.

**Seminar Goals:**

The participants in this seminar learn the fundamentals of proper configuration, programming and test procedures for HRC applications.

**Topics Covered:**

- Characteristics of Human-Robot-Collaboration (HRC)
  - Introduction into HRC
  - Main risks in HRC applications
  - Collaboration and complete automation
- Overview of risk assessment of HRC applications
  - Basics and intent
  - Particularities of risk assessing HRC applications
  - Exemplary design and realization of a HRC application
- Forces and torques in the robot model
- Torques in the robot model
- Assessment of forces
- Safety configuration
  - Safety and Monitoring functions
  - Safety-oriented controller ARGUS
  - Stop reactions
  - Atomic Monitoring Functions
  - Permanent Safety Monitoring
  - Event-driven Safety Monitoring
- Load changes
  - Effects of load data
  - TCP force monitoring
- Using comfort functions in HRC applications
  - Reading Cartesian forces and torques
  - Conditions for normal and shear forces
  - Data recording and analysis
- Validation and verification of safety functions in HRC applications
  - Test report

**Final assessment:**

- The course ends with an achievement test
- A certificate is issued on completion of the course.

**Student requirements:**

- Long pants, closed-toed shoes, no shorts, no sandals

**Prerequisites:**

- seminar: **LBR iiwa – Commissioning and Programming**
- Basic knowledge in the field of design, planning and feasibility of robot cells
- ❖ A laptop pc with recommended specifications: Pentium IV processor, 2500 MHZ, 2 GB RAM, Windows 7 (32 bit or 64 bit) or WinXP (32 bit only, SP3 min) for use with the Sunrise. Workbench and Work Visual.

**Length of seminar:**

3 Days

**Tuition fees:**

USD \$1,545

**Time:**

8:00 am to 4:00 pm

**Location:**

**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**

For current course dates, please contact KUKA College directly.

**Contact:**

Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Electrical Servicing KUKA Sunrise Cabinet

**Controller Type:**  
KUKA Sunrise Cabinet

**Target Group:**  
Robot service technicians

**Seminar Goals:**  
Goal of the seminar is to acquire the necessary knowledge for safe handling and operation of the robot station KUKA LBR iiwa as well as for fault diagnostics and troubleshooting with the related robot control KUKA Sunrise Cabinet.

**Topics Covered:**

- Safe interaction with the KUKA LBR iiwa robot station
- Recognizing and avoiding electrical hazard related to handling the modules of a KUKA Sunrise Cabinet control
  - Avoiding hazards to ESD-sensitive elements of a KUKA Sunrise Cabinet control
  - Overview of the safety devices of a KUKA LBR iiwa robot station
- Basic knowledge of the KUKA LBR iiwa robot station setup
  - Overview of hardware and software
- Moving the robot manually
  - Jogging of robot axes
  - Jogging the robot by using linear movements
  - Jogging the robot with zero space motion
  - Repositioning the robot by using frames
- Human-machine communication
  - Recognizing and understanding robot messages
  - Reading and changing of process data
  - Checking and setting of input- and output signals
  - Reading the current robot position
- Changing a robot position
- Basic knowledge of the structure of a KUKA Sunrise Cabinet control
  - Technical data and control concept
  - Interfaces
  - Properly replacing the control PC
  - Replacing individual PC modules
- Principles of mastering and referencing
- Overview of the bus systems of the KUKA Sunrise Cabinet control

Continued on next page...

**Prerequisites:**

- Electrical specialist

**Length of seminar:**  
4 days

**Tuition fees:**  
USD \$2,060

**Time:**  
8:00 am to 4:00 pm

**Location:**  
**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
Stacey Newstead  
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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Electrical Servicing KUKA Sunrise Cabinet

### Topics Covered continued:

- Basic principles of Ethernet-based field buses of the KUKA Sunrise Cabinet control
- Familiarization with media flanges
  - Electric media flanges
  - Pneumatic media flanges
  - Hybrid types
- Safety concept of the KR C4 compact
  - Safety by means of ProfiSAFE or the Safety Interface Board
  - Safety functions via CCUsr
- Data archiving and system recovery by means of images
- Diagnostic options and troubleshooting directly at the controller
- Maintenance intervals and practical performance of maintenance on the controller

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the achievement test.

### Student requirements:

- Long pants, closed shoes, cotton shirts, no shorts, no sandals

### Contact:

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College Coordinator  
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Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Commissioning KUKA Robots KR C4 / KR C4 compact

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**  
System Integrators, Commissioning Engineers.

**Seminar Goals:**  
Goal of this seminar is to enable system integrators and commissioning engineers the commissioning of KR C4/KR C4 compact based KUKA robot systems. Topics covered in the seminar include mechanical and electrical commissioning of the system, fieldbus configuration with KUKA.WorkVisual, mastering the robot, tool calibration, configuration of the interface to the plc. Practical exercises are performed with KUKA College training cells with KR 16 robots and KR C4 controllers which will be commissioned during the course starting with the initial KUKA.WorkVisual project and ending with the completely functional robot cell.

- Topics Covered:**
- Safety when working with KUKA robots
  - Mounting the robot manipulator
    - Transport
    - Installing the mounting base
    - Installing the machine frame mounting assembly
    - Installing the robot: floor/ceiling
  - Overview of the KR C4 controller
    - Technical data and controller concept
    - Cabinet cooling
    - Connection panel interface
    - Safety interface X11
    - Safety functions via Ethernet-based safety interface
  - Overview of the field bus systems of the KR C4 controller
  - Electromagnetic compatibility EMC
    - Grounding concept
  - Basic principles of network technology
    - KR C4 relevant network components
    - Choosing and assigning IP-addresses and subnet masks
    - Configuring the KUKA Line Interface
    - Establishing a local network connection with the KR C4 controller

Continued on next page...

**Prerequisites:**

- Minimum 3 years of relevant vocational training

**Requirements:**

- ❖ A laptop pc with recommended specifications: Pentium IV processor, 2500 MHZ, 2 GB RAM, Windows 7 (32 bit or 64 bit) or WinXP (32 bit only, SP3 min) for use with Work Visual.
- ❖ Or contact KUKA to borrow one

**Length of seminar:**  
5 Days

**Tuition fees:**  
USD \$2,575

**Time:**  
8:00 am to 4:00 pm

**Location:**  
**KUKA Robotics Corporation**  
51870 Shelby Parkway  
Shelby Township, Michigan  
48315

**Course dates:**  
For current course dates, please contact KUKA College directly.

**Contact:**  
Stacey Newstead  
College Coordinator  
Tel: 905-858-5852 x8990  
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[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Commissioning KUKA Robots KR C4 / KR C4 compact

### Topics Covered continued:

- KUKA.SystemRecovery
- Performing a back-up
- Commissioning with KUKA.WorkVisual
  - Loading and comparing projects and assigning projects to the KR C4 controller
  - Saving the initial project
  - Merging projects
  - Adding catalog elements to an existing project
- Configuring system safety
  - Selecting hardware options
  - Changing the safety-ID of the PROFISAFE-device
- Commissioning PROFINET, ETHERNET/IP, DEVICENET
  - Configurations with KUKA.WorkVisual
  - basics and devices
  - Installing the option on the KR C4
  - Configuring the KR C4 as the controller and as the device
  - Activating safety via PROFISAFE
  - Diagnosis tools
- Adapting the PLC interface of the KR C4
- Jogging the robot
  - Start-up mode
  - Axis-specific jogging
  - Coordinate systems used at the KR C4
  - Cartesian jogging (WORLD-coordinate system)
  - Jogging the robot with fixed tool
  - Jogging external axes
- Mastering the robot
  - Mastering concept
  - Performing robot mastering
- Modifying software limit switches
- Loads at the robot
  - Robot payload
  - Using KUKA.LoadDataDetermination
  - Supplementary loads

- Tool calibration
  - Calibrating TCP and orientation of tools mounted on the robot flange
  - Calibrating fixed tools
- Calibrating a base (workpiece related coordinate system)
- Energy supply system
- Overview energy supply system types
- Adjusting the dress package to minimize wear

### Final assessment:

- The course ends with an achievement test.
- A certificate is issued on successful completion of the course.

### Student requirements:

- Long pants, closed-toed shoes, no shorts, no sandals

### Contact:

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College Coordinator  
Tel: 905-858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Custom Workshops

**Controller Type:**  
KR C4, KSS V8.x

**Target Group:**

Operators, service technicians, maintenance personnel, robot programmers, system integrators, system programmers & software engineers

**Workshop Details:**

- Custom workshops are geared toward the individual or group requesting training for specific topics of interest.
- Suitable for students or companies who:
  - require guidance on a specific project or task and wish to provide KUKA with a specific list of topics
  - do not have the required minimum number of students (4) to pursue a certified course and course is not currently on the schedule and training is essential
  - experienced programmers/operators/integrators with other robot products and require an overview of KUKA's system
  - wish to obtain on-site training at customer location

**Workshop Rates:**

	# Hours	1 STUDENT		2 STUDENT		3 STUDENT		4 STUDENT		5 STUDENT		6 STUDENT	
		1 student	per student rate (1 student)	2 students	per student rate (2 student)	3 students	per student rate (3 student)	4 students	per student rate (4 student)	5 students	per student rate (5 student)	6 students	per student rate (6 student)
1-Day	8	1,210	1,210	1,560	780	1,910	637	2,260	565	2,610	522	2,960	493
2-Day	16	2,420	2,420	3,120	1,560	3,820	1,273	4,520	1,130	5,220	1,044	5,920	987
3-Day	24	3,630	3,630	4,680	2,340	5,730	1,910	6,780	1,695	7,830	1,566	8,880	1,480
4-Day	32	4,840	4,840	6,240	3,120	7,640	2,547	9,040	2,260	10,440	2,088	11,840	1,973
5-Day	40	6,050	6,050	7,800	3,900	9,550	3,183	11,300	2,825	13,050	2,610	14,800	2,467

The above rates are for standard workshops held at our KUKA Canada facility in Mississauga, Ontario. Additional fees will apply for onsite workshops. (ie. instructor travel time and expenses)  
Additional preparation fees may apply for workshops requiring extensive customization.

**Note:**

- No achievement test for workshops
- No certificate issued for workshops
- No printed materials/manual provided

**Contact KUKA College for a customized quote.**

**Contact:**

Stacey Newstead  
College Coordinator  
Tel: (905) 858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)

Gary Knight  
KUKA College Supervisor  
Tel: (905) 858-5852 x8986  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Option: Customer Site Training - Mobile Training Cells

### General prerequisites:

- 2 cells per class, 2 students per robot
- 4 student minimum/maximum
- Training room with whiteboard and overhead projector
- Robots must have been set up and put into operation prior to start

### Courses Offered:

- Operator (2 Day)
- Operator pro (4 Day)
- Programming 1 (5 Day)
- Programming 2 (5 Day)
- Retrain (5 Day)

### KR C4 compact KR6 R700 sixx KSS V8.x Requirements:

- 10' x 10' work area for each training cell
- 120V 20Amp standard, non-GFI, wall outlet or 200-240 Vac power
- Each cell needs compressed air
- Forklift that will handle 1400 pounds



Contact KUKA College for more details and to request a quote for on-site training.

### Contact:

Stacey Newstead  
College Coordinator  
Tel: (905) 858-5852 x8990  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)

Gary Knight  
KUKA College Supervisor  
Tel: (905) 858-5852 x8986  
Fax: (905) 858-5851  
[College.ca@kuka.com](mailto:College.ca@kuka.com)



## Government Funding for Certified Training

Did you know your company may qualify for government funding toward certified training with KUKA Robotics Canada?

**Mentor Works** is an Ontario-based company who will help your business discover government funding and streamline the application process.

**Canada Job Grant** offers funding for 3<sup>rd</sup> party training, technical skills, business and leadership development training, etc. Please note approval process takes on average **4 weeks** to be approved.

For more information, contact:

**Mentor Works Ltd.**

[www.mentorworks.ca](http://www.mentorworks.ca)

Office: 519-731-2345

Toll Free: 1-888-599-3111

KUKA Robotics Canada would be happy to provide a formal quote to assist with your application.

**Contact:**

Stacey Newstead

College Coordinator

Tel: (905) 858-5852 x8990

Fax: (905) 858-5851

[College.ca@kuka.com](mailto:College.ca@kuka.com)

Gary Knight

KUKA College Supervisor

Tel: (905) 858-5852 x8993

Fax: (905) 858-5851

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## **KUKA College**

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L5N 8G6 Canada  
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