



# Using Vision-based Applications with the Kria KV260 Vision AI Starter Kit & System-on-Module

SOM-VISION (v1.0)

## Course Specification

### Course Description

This course will help you learn about the Kria™ System-on-Module (SOM) and Kria KV260 Vision AI Starter Kit, enabling you to accelerate vision-based applications using the KV260 Starter Kit right out of the box without any installation or FPGA knowledge.

The course also provides information on how you can build your own hardware and software components, customize an AI model, and perform benchmarking. In addition, design guidelines for developing your own carrier card are covered.

The emphasis of this course is on:

- Providing an overview of the Kria K26 SOM and its advantages
- Providing an overview of the Kria KV260 Vision AI Starter Kit and how to get started with the kit
- Running accelerated applications, such as the Smart Camera, AI Box, and Defect Detection applications, using the kit
- Running the NLP SmartVision demo application using the kit with the PetaLinux and Ubuntu images
- Building the hardware and software design components from scratch
- Customizing the AI models used in the applications
- Reviewing the design guidelines for developers to design their own carrier card

#### What's New for 2022.1

- Added more content on the different supported tool flows for building hardware and software components
- Added Ubuntu image support for the NLP SmartVision accelerated application
- Updated the content with VVAS 2.0 and Vitis AI tool 2.0 support
- All labs have been updated to the latest software versions

#### Level – SOM 1

##### Course Details

- 2 days
- 8 lectures
- 5 labs
- 3 demos

##### Price –

##### Course Part Number – SOM-VISION

##### Who Should Attend?

- Software and AI developers who want to get started with using Kria SOMs

##### Prerequisites

- Basic knowledge of an embedded application development flow
- Vitis AI tool flow

##### Software Tools

- Vivado® Design Suite 2022.1
- Vitis™ unified software platform 2022.1
- PetaLinux Tools 2022.1

##### Hardware

- Kria KV260 Vision AI Starter Kit
- MicroSD card (16 or 32 GB)
- Power supply (12V, 3A adapter)
- Camera module (AR1335 or USB webcam)
- 4K monitor as a display device
- USB microphone
- Cables such as Ethernet, micro-USB to USB-A, and HDMI or

#### DisplayPort

After completing this comprehensive training, you will have the necessary skills to:

- Describe the Kria K26 SOM and its advantages
- Describe the features and capabilities of the KV260 Vision AI Starter Kit carrier card
- Get started with the Vision AI Starter Kit
- Deploy vision-based applications, such as the Smart Camera, AI Box, Defect Detection, and NLP SmartVision applications, using the kit
- Build the hardware and software design components from scratch
- Customize the AI models used in the applications
- Design your own carrier card

### Course Outline

#### Day 1

##### Kria System-on-Module (SOM) Overview

Introduces the Kria K26 SOM and describes its advantages. Also outlines the features, functional interfaces, mechanical, and thermal aspects of the SOM. {Lecture}

##### Kria KV260 Vision AI Starter Kit Overview

Provides an overview of the Kria KV260 Vision AI Starter Kit, its features, and interfaces. The boot devices, heat sink, firmware, and power-on sequence for the kit are also described. {Lecture}

##### Getting Started with the Vision AI Starter Kit

Covers how the initial board setup looks like and how to set up the SD card, make the necessary connections with the kit, and boot the kit. Also shows how to use the platform management utility to install, select, and deploy different applications. {Lecture, Demos}

##### Introduction to Vitis Video Analytics SDK (VVAS)

Provides an overview of the Vitis Video Analytics SDK (VVAS) technology and its core components. {Lecture}

##### Accelerating Applications with the KV260 Vision AI Starter Kit

Describes the top-level block diagram and pipeline stages for different accelerated applications, such as the Smart Camera, AI Box, Defect Detection, NLP SmartVision applications. Also demonstrates how to deploy these applications using the KV260 Starter Kit. {Lecture, Demos, Labs}

#### Day 2

##### Building the Hardware and Software Design Components

Illustrates how the hardware and software design components are built from scratch for an accelerated application. {Lecture, Lab}

##### Customizing the AI Models

Shows how to customize the AI models used in the accelerated applications. {Lecture, Lab}

##### Kria SOM Carrier Card Design Guide

Outlines the electrical, mechanical, firmware, thermal, and power-on configuration design considerations that must be addressed as part of designing an AMD-Xilinx SOM-compatible carrier card. {Lecture}