STAAD.Pro is one of the widely used structural analysis and design software by the structural engineering community around the world. It is a feature rich, flexible, powerful, and easy to use software. It provides the users both the command line as well as the graphical interface to model almost any type of structure. I said ALMOST because though the software provides many great features and flexibility for the geometry creation and load application, sometimes it becomes tedious and time consuming to model some complex structures or to apply a complex type of loading and in some cases where it involves the modelling of repetitive structures; it is also preferred to automate these repeated activities. So, how the STAAD solves these issues? The answer is OpenSTAAD. OpenSTAAD is an API which is an acronym for Application Programming Interface that exposes a library of functions used to interact with the parent application. STAAD.Pro becomes even more powerful and flexible when it is combined with OpenSTAAD.

Hi,

Welcome to my course 'OpenSTAAD for Structural Engineers'. My name is Srinivas and I'll be guiding you through this course.

About me:

I am structural engineer with master's degree in Engineering Structures and I have been working in the design of various structures for the last 15years using STAAD.Pro software in combination with OpenSTAAD.

In this introduction video we will be looking at what this course is all about, how the course is structured and who this course is intended for. That said, let us go further into the details.

1. What this course is...

   As I said already, OpenSTAAD is an API (Application Programming Interface) exposed by the STAAD.Pro application to create, modify/update, analyse & design and extract the analysis or design results for a structure by using some of the programming languages like VBA, VB.NET, C#.NET etc., almost without touching the GUI of the STAAD.Pro applications. I said almost because, there are some cases in which you are forced to used GUI which we will be discussing whenever such a case is arises.

   Now, you may be thinking that, why do I even need to bother about writing a program when the STAAD.Pro application itself provides so much of flexibility to create structures and edit the data using STAAD.Pro editor? Well, I won't be answering your question immediately because we will get this type of questions clarified in our further sections; however, to tell you briefly, we need an API like OpenSTAAD to create the structures which are repetitive or more complex in nature yet in an easier way.

2. Course structure

   01. Introduction

       This is the section we are currently in. It's just an introduction about the course.

   02. OpenSTAAD Basics

       In this section, we will first understand what exactly OpenSTAAD is, where to get the help in case of any difficulties; we also look at some of the functions or methods explained in OpenSTAAD help to understand how they work.

3. Target audience

01. Any structural engineer who is currently working on STAAD.Pro and wants to automate his/her design to reduce time consumption.

02. Those who want to enhance their skills in structural engineering design field.

Prerequisites:

To effectively leverage the maximum benefit out of this course, I assume that,

1. You can create, analyse, and design a simple structure in STAAD.Pro using either GUI or Editor.
2. You also know how to write macros in VBA.

Section 02: OpenSTAAD Basics

Points to note while preparing various sections of the videos:

1. Brief introduction about STAAD.Pro works. Explain nodes or joints, beams or members etc., and how they are formed. Discuss about the types of loading that can be done in STAAD.Pro to support point no. 2 below.

2. Introduce OpenSTAAD and explain what type of complex situations can be handled by OpenSTAAD. Show thickener model generation and seismic load application as an example.

3. Discuss about the compatibility part of the OpenSTAAD with previous and current versions of STAAD.Pro

4. Discuss about the supported programming languages and the different ways of automation using VBA alone like from Excel VBA, STAAD In-Built VBA and VB.NET of Visual Studio

5. Discuss about the forums and resources available

6. Discuss about the categories of functions available in OpenSTAAD like root functions, geometry functions etc.,

7. Discuss about how find the list functions available in OpenSTAAD using documentation and object browser with Excel and mention about the undocumented functions.

8. Explain about functions especially from the perspective that the functions with return value and without return value etc., and explain the variables and its meaning

9. Take an <u>example</u> of the available functions e.g., root function or geometry and walkthrough.

10. Describe about adding a reference to '<u>OpenSTAADUI</u>' in the Excel VBA references sections.

11. Create OS object as '<u>Object</u>' and as '<u>OpenSTAAD</u>'. Discuss on the <u>intellisense</u> part and after that discuss, how to update the whole program using 'Object' instead of 'OpenSTAAD' once the application is completed.

12. State the compatibility and applicability of this course to the new <u>CONNECT Edition</u> of STAAD.Pro.

Section 03: Instantiating and accessing OpenSTAAD members

Points to note while preparing various sections of the videos:

1. Show how to create and instantiate OpenSTAAD object by taking an example in Excel VBA.