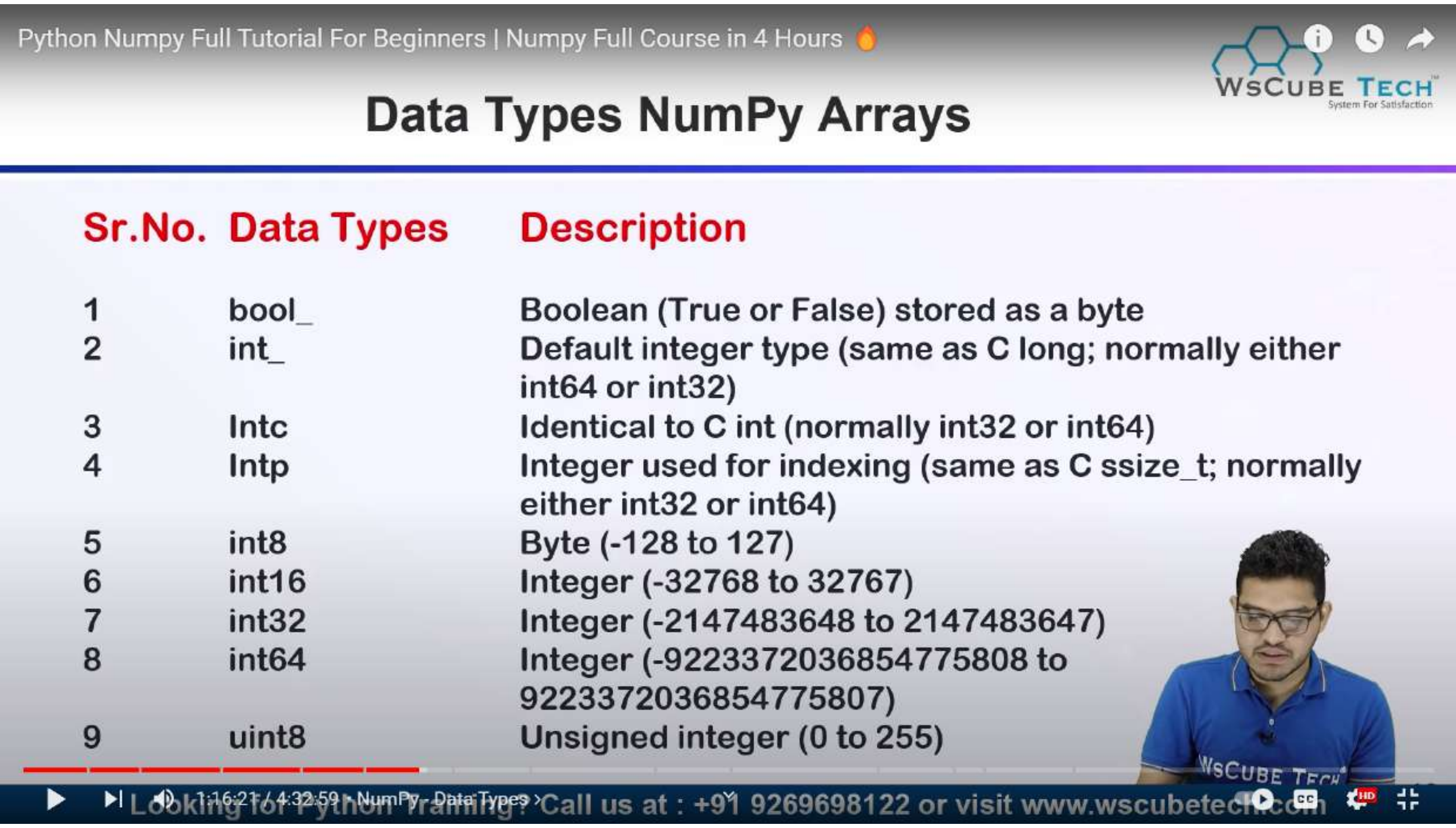
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1:16:21 / 4:32:59 • NumPy - Data Types ›
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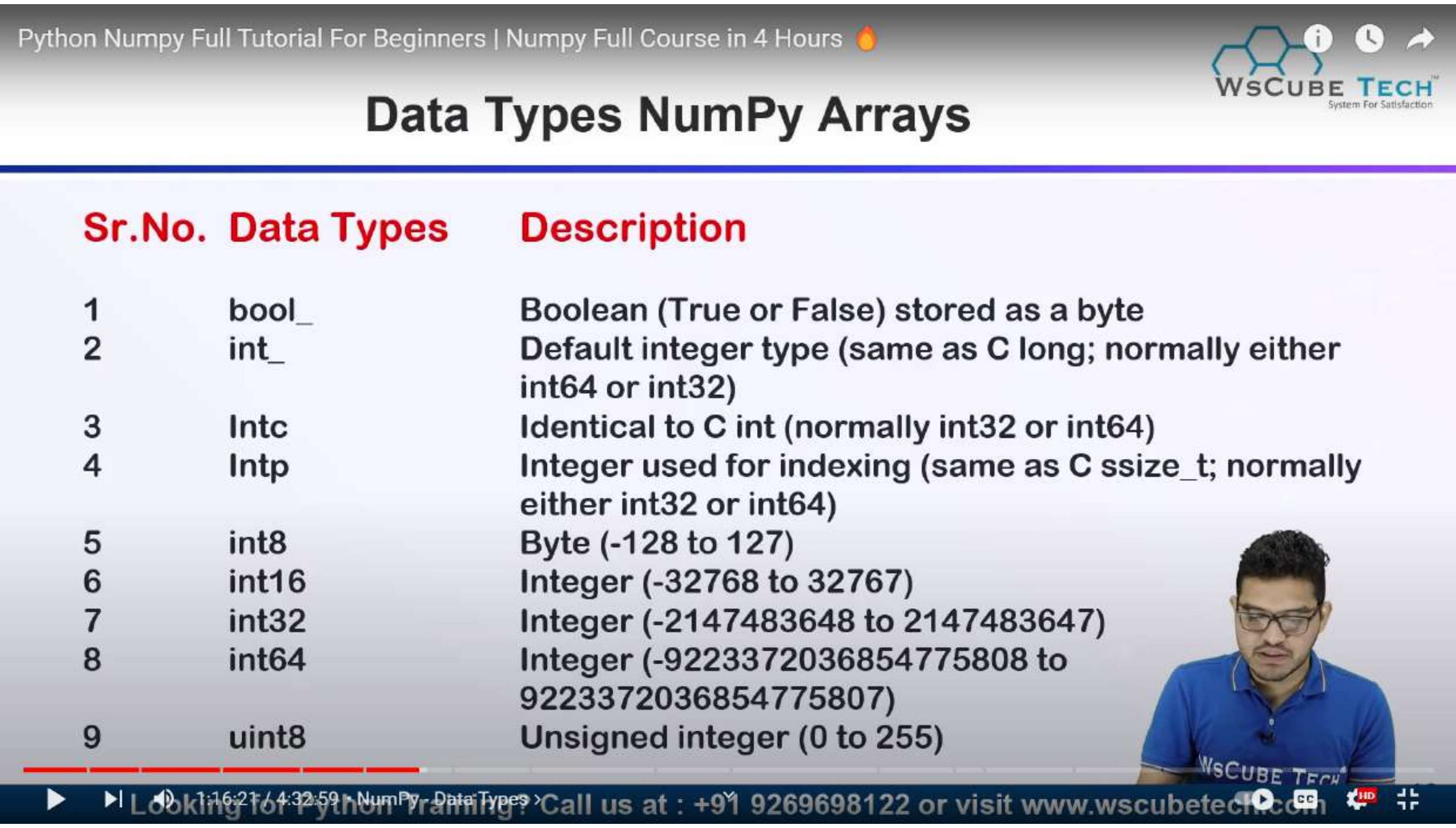
Data Types NumPy Arrays

Sr.No.	Data Types	Description
1	bool_	Boolean (True or False) stored as a byte
2	int_	Default integer type (same as C long; normally either int64 or int32)
3	Intc	Identical to C int (normally int32 or int64)
4	Intp	Integer used for indexing (same as C ssize_t; normally either int32 or int64)
5	int8	Byte (-128 to 127)
6	int16	Integer (-32768 to 32767)
7	int32	Integer (-2147483648 to 2147483647)
8	int64	Integer (-9223372036854775808 to 9223372036854775807)
9	uint8	Unsigned integer (0 to 255)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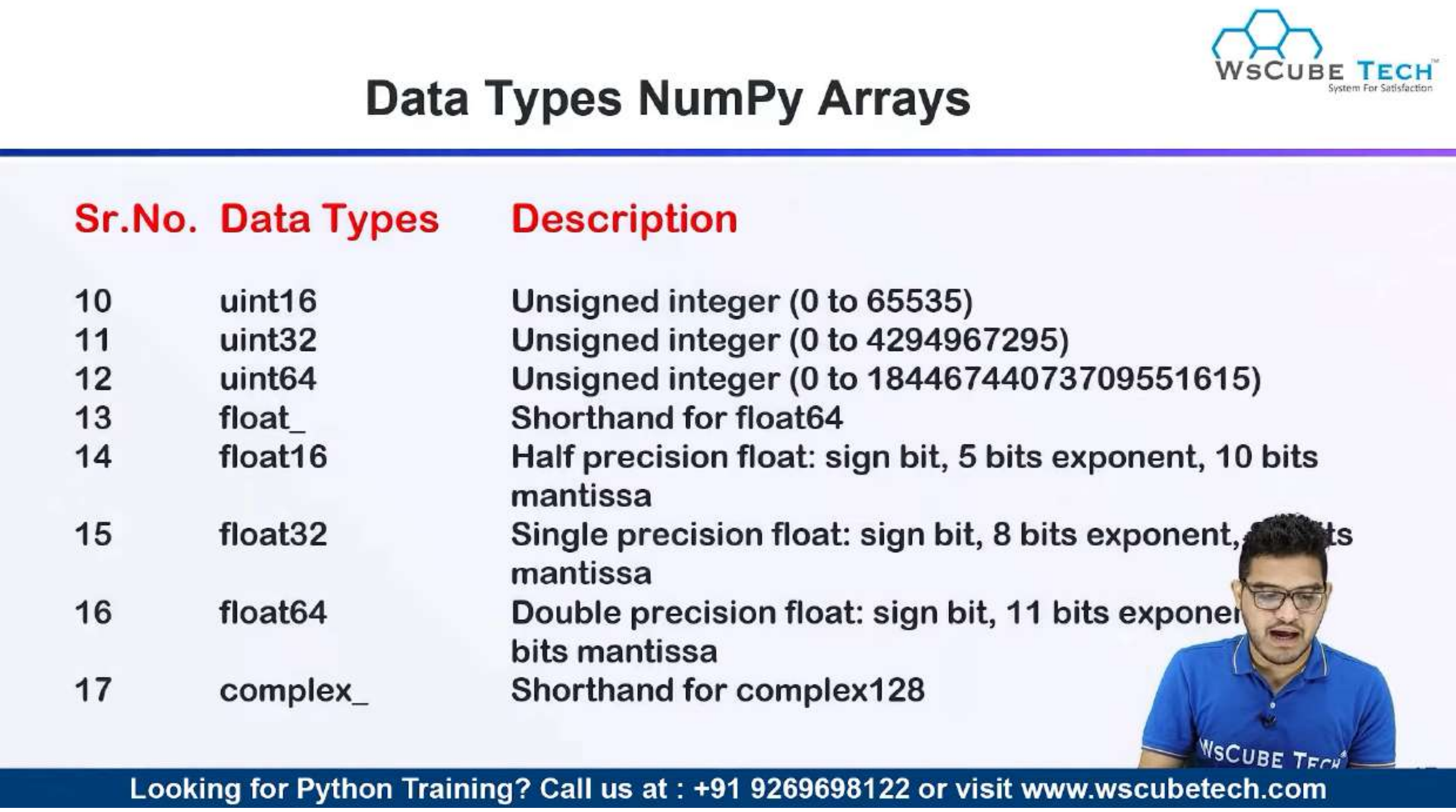
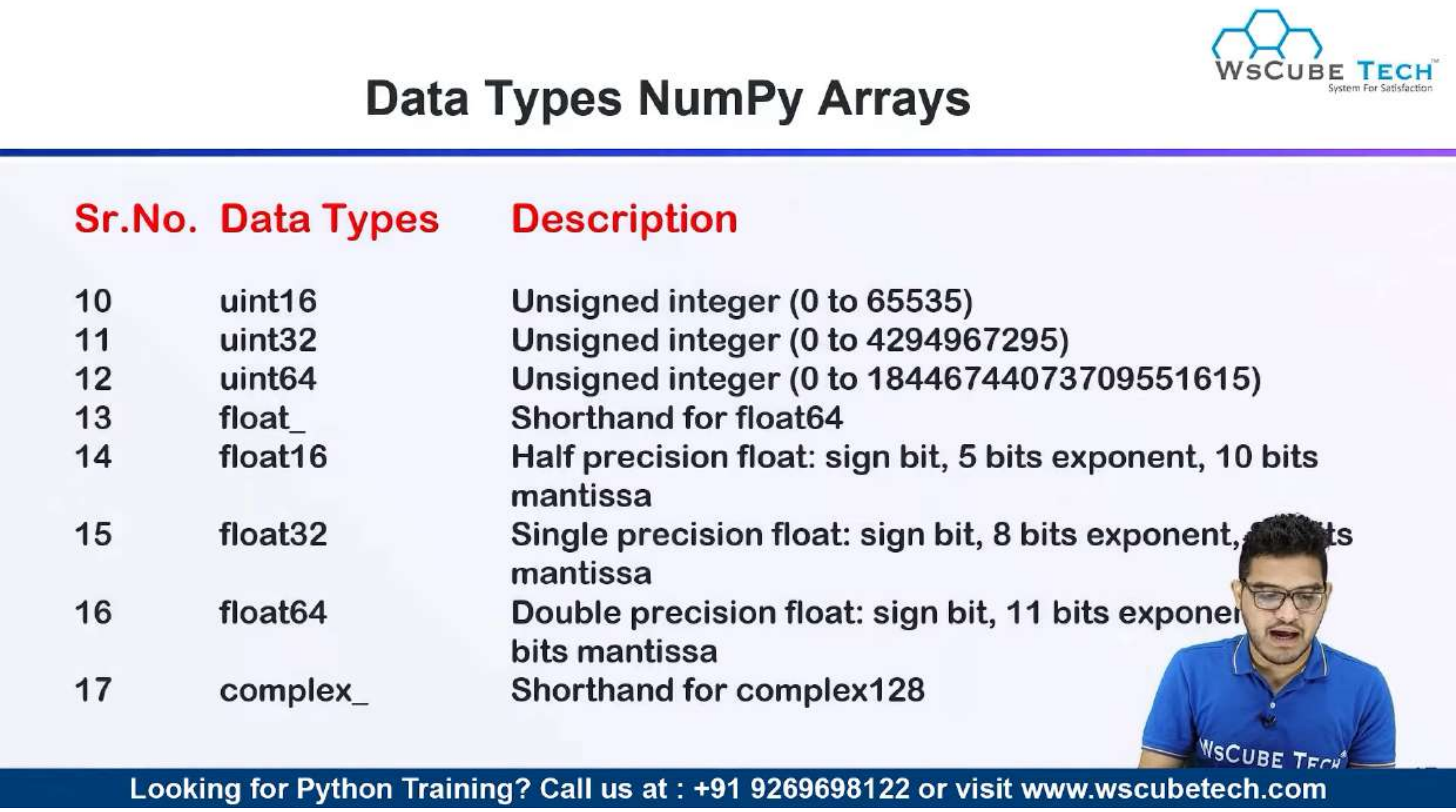


Data Types NumPy Arrays

Sr.No.	Data Types	Description
10	uint16	Unsigned integer (0 to 65535)
11	uint32	Unsigned integer (0 to 4294967295)
12	uint64	Unsigned integer (0 to 18446744073709551615)
13	float_	Shorthand for float64
14	float16	Half precision float: sign bit, 5 bits exponent, 10 bits mantissa
15	float32	Single precision float: sign bit, 8 bits exponent, ts mantissa
16	float64	Double precision float: sign bit, 11 bits exponen bits mantissa
17	complex_	Shorthand for complex128



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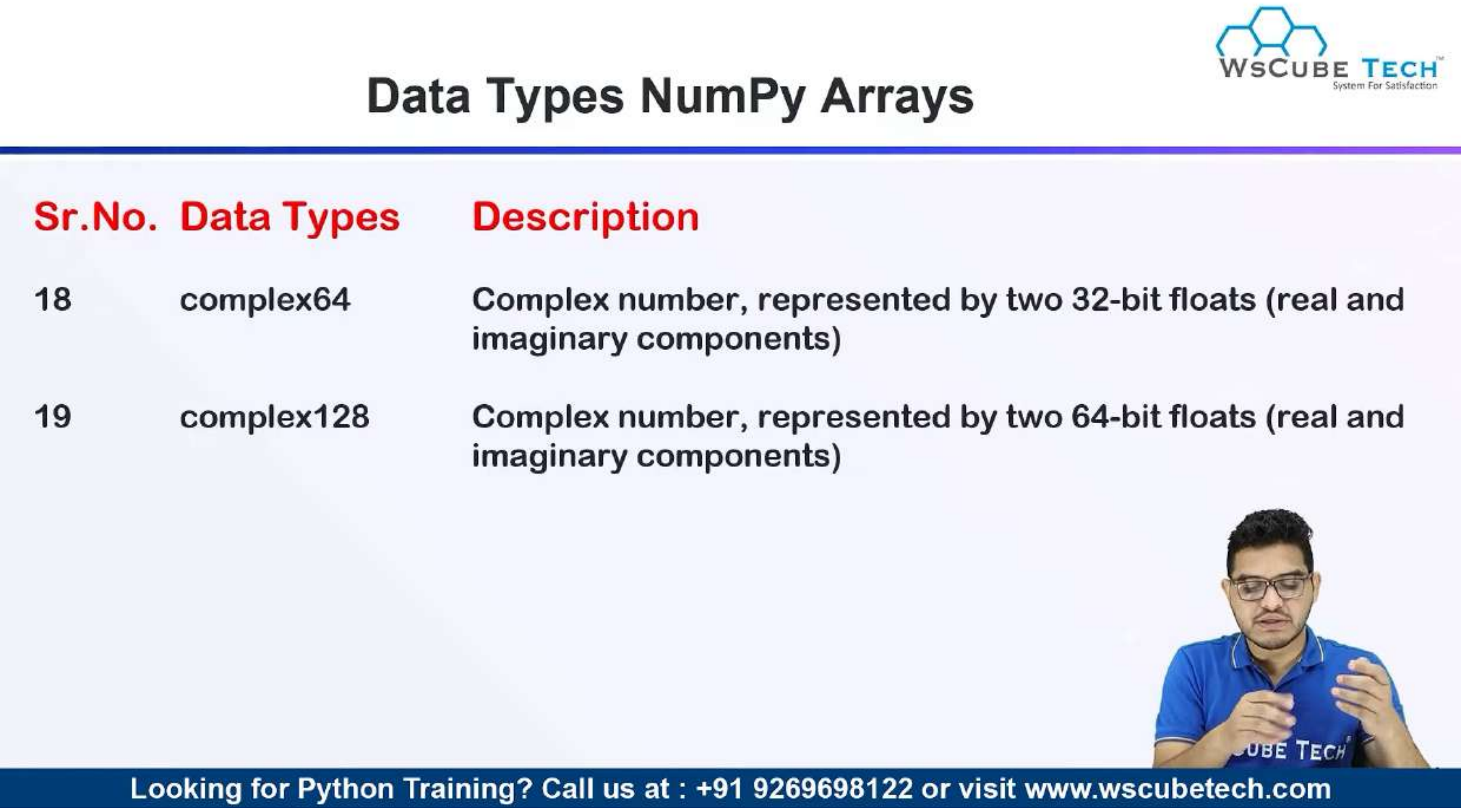
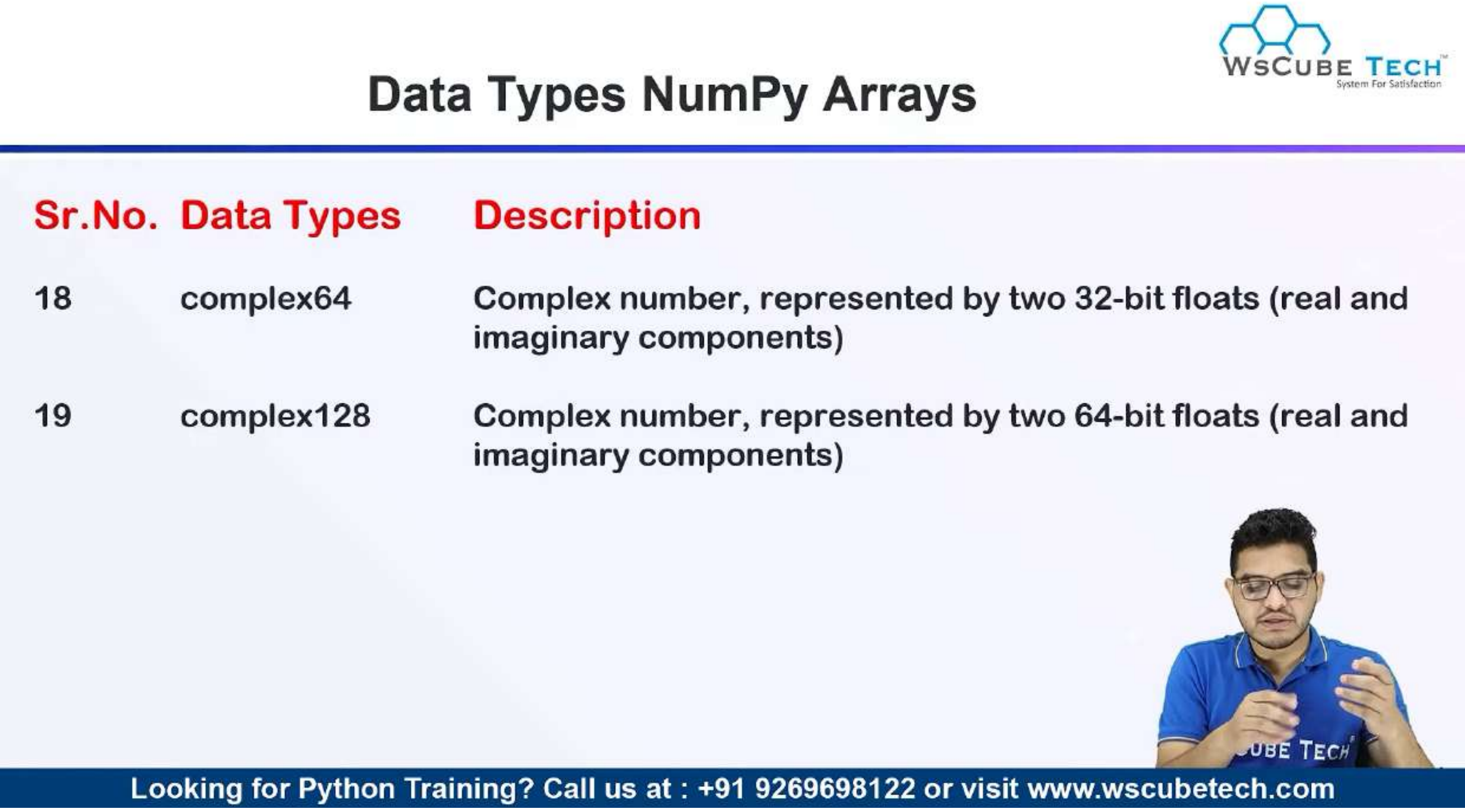


Data Types NumPy Arrays

Sr.No.	Data Types	Description
18	complex64	Complex number, represented by two 32-bit floats (real and imaginary components)
19	complex128	Complex number, represented by two 64-bit floats (real and imaginary components)



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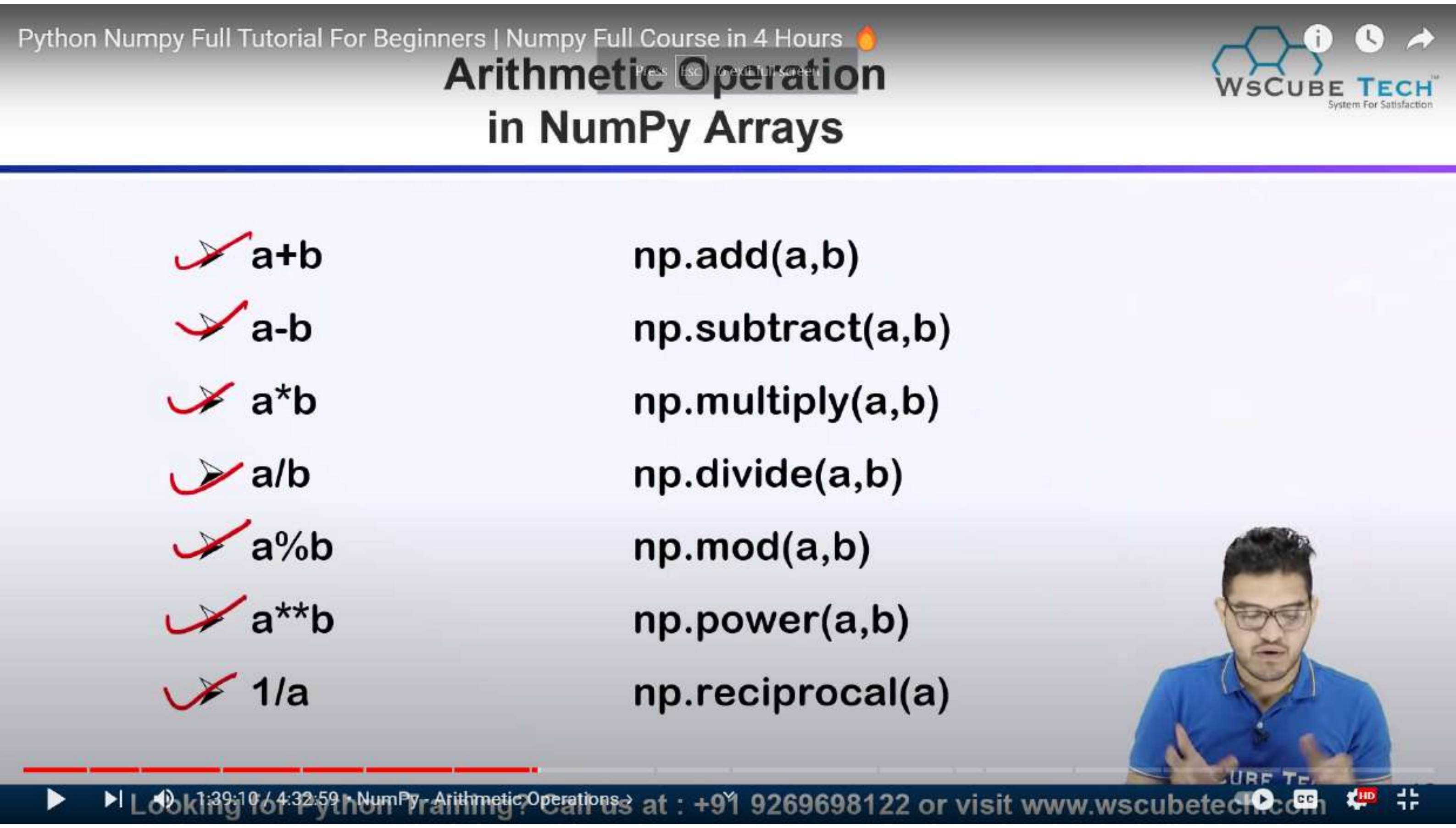
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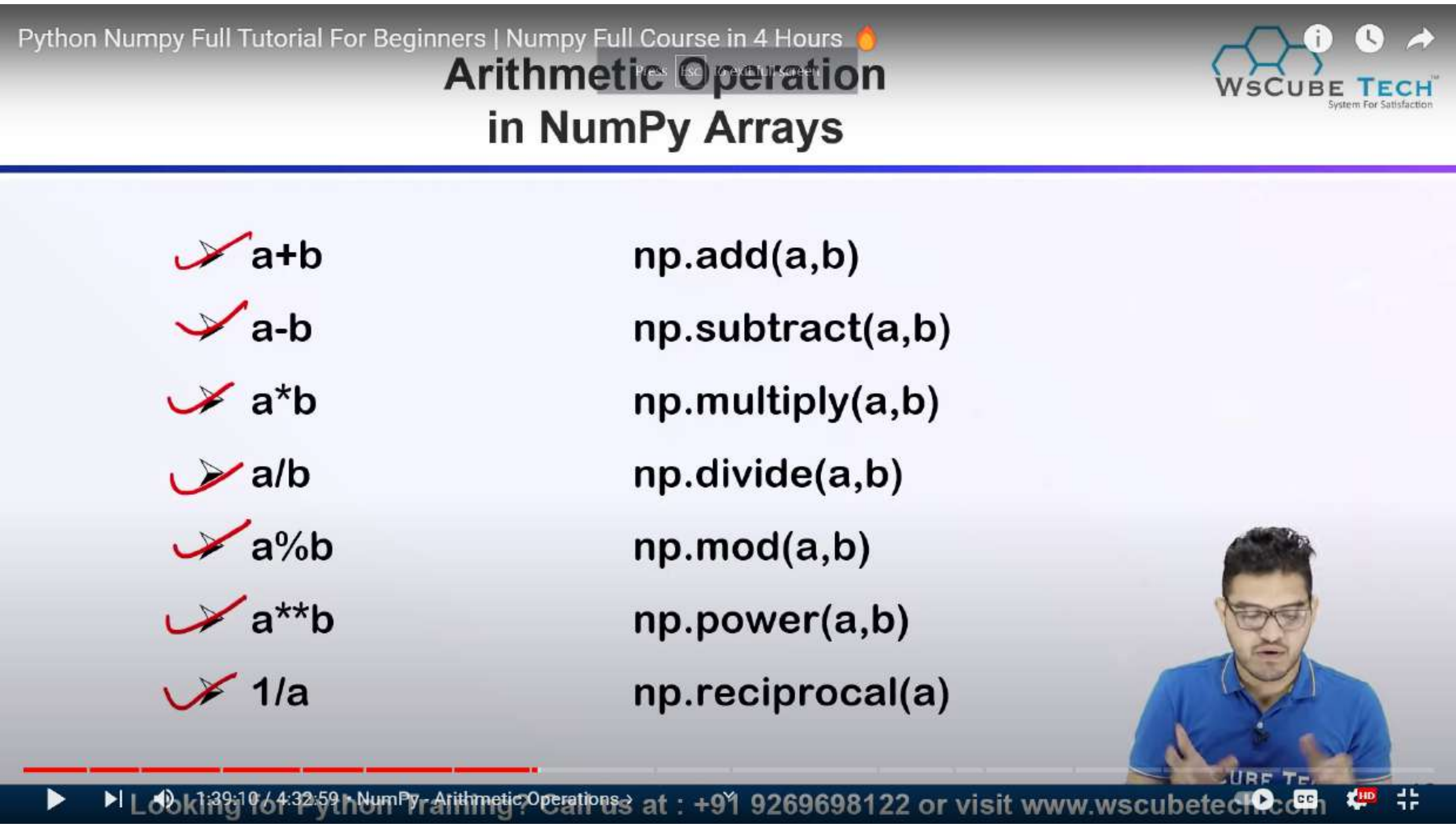
Arithmetic Operation in NumPy Arrays

✓ a+b	np.add(a,b)
✓ a-b	np.subtract(a,b)
✓ a*b	np.multiply(a,b)
✓ a/b	np.divide(a,b)
✓ a%b	np.mod(a,b)
✓ a**b	np.power(a,b)
✓ 1/a	np.reciprocal(a)



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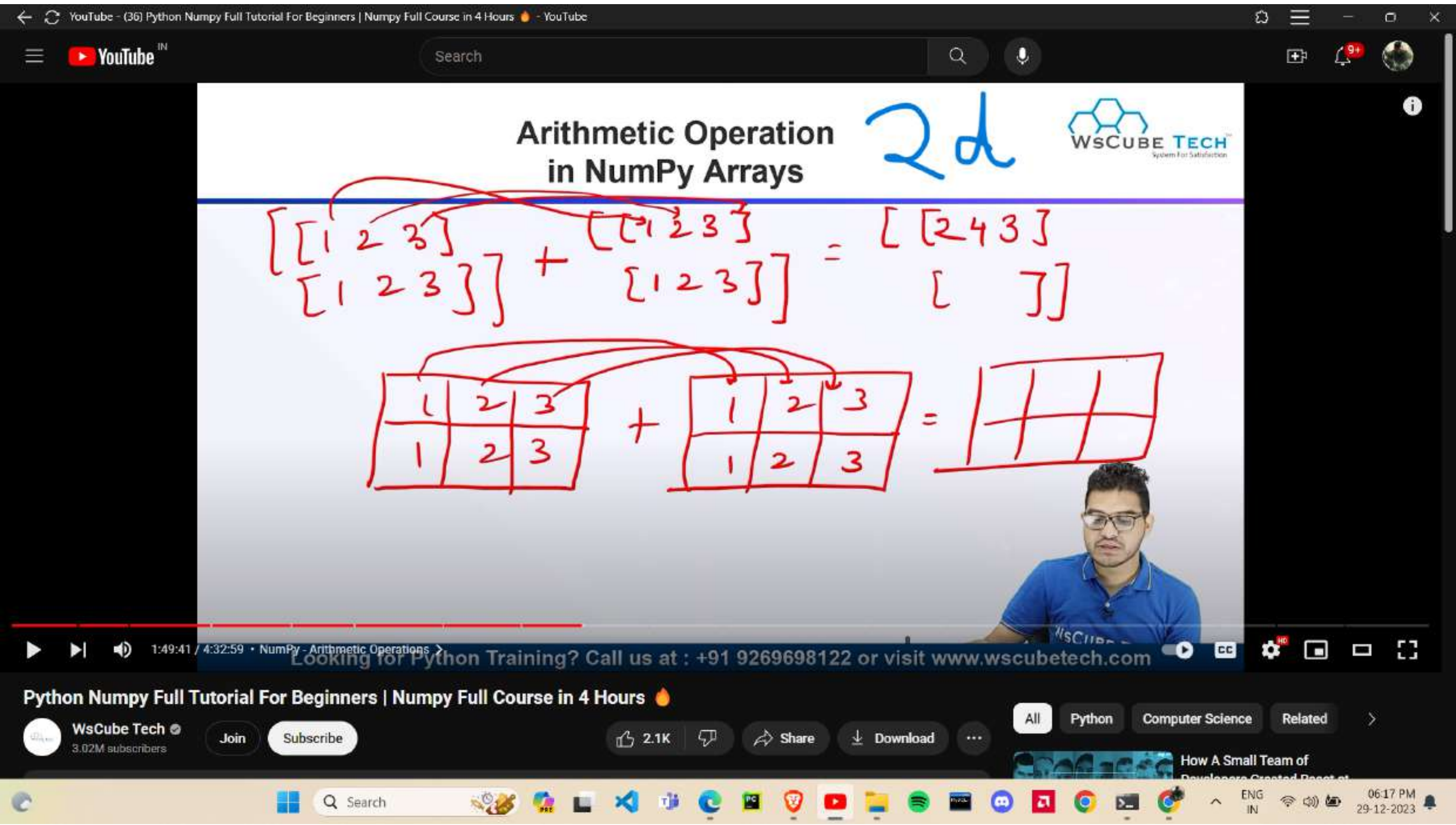

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Arithmetic Operation in NumPy Arrays

2d

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[[1 2 3]
[1 2 3]] + [[1 2 3]
[1 2 3]] = [[2 4 3]
[ ]]

1	2	3
1	2	3

+

1	2	3
1	2	3

=

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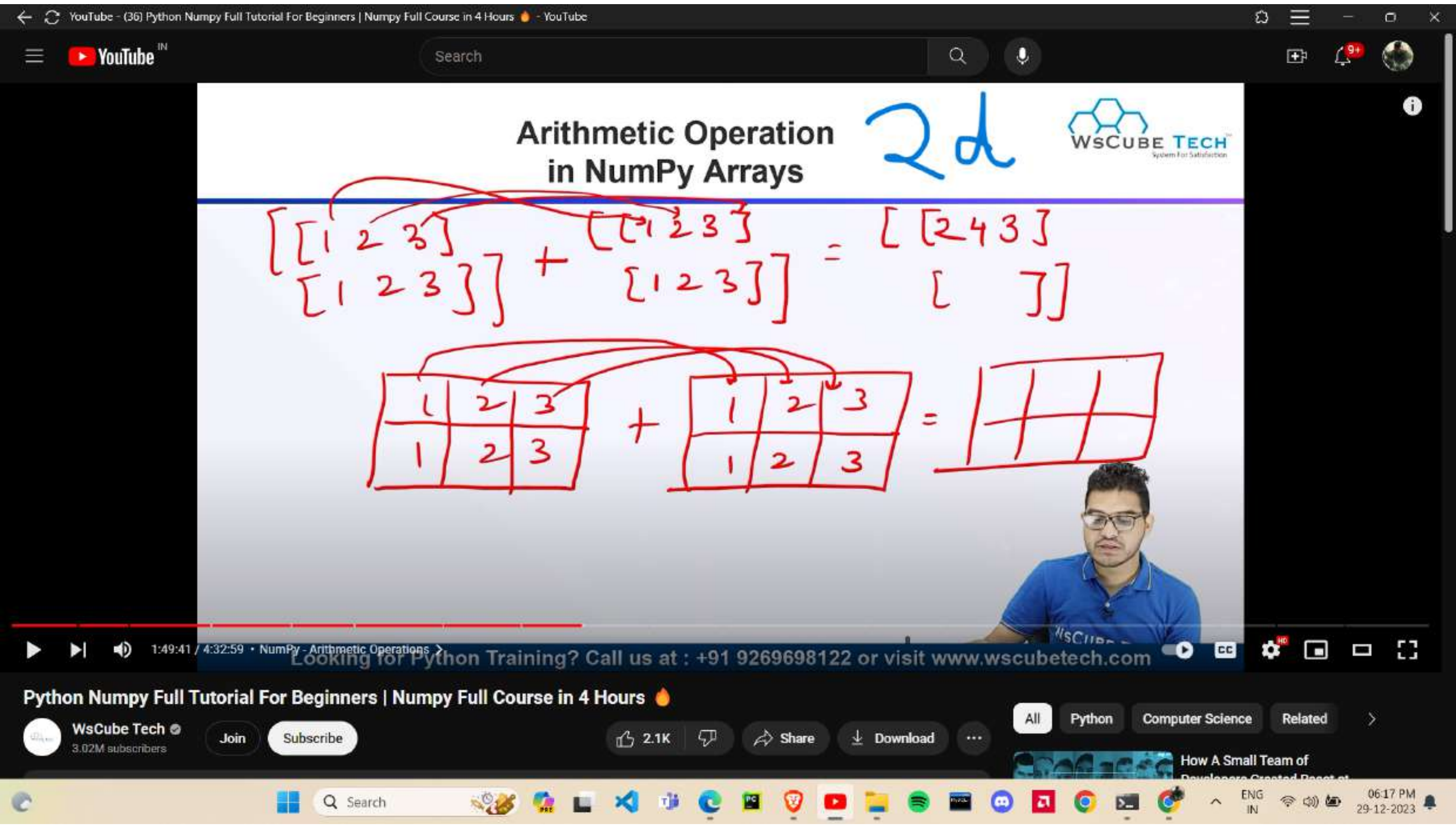

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Arithmetic Operation in NumPy Arrays

2d

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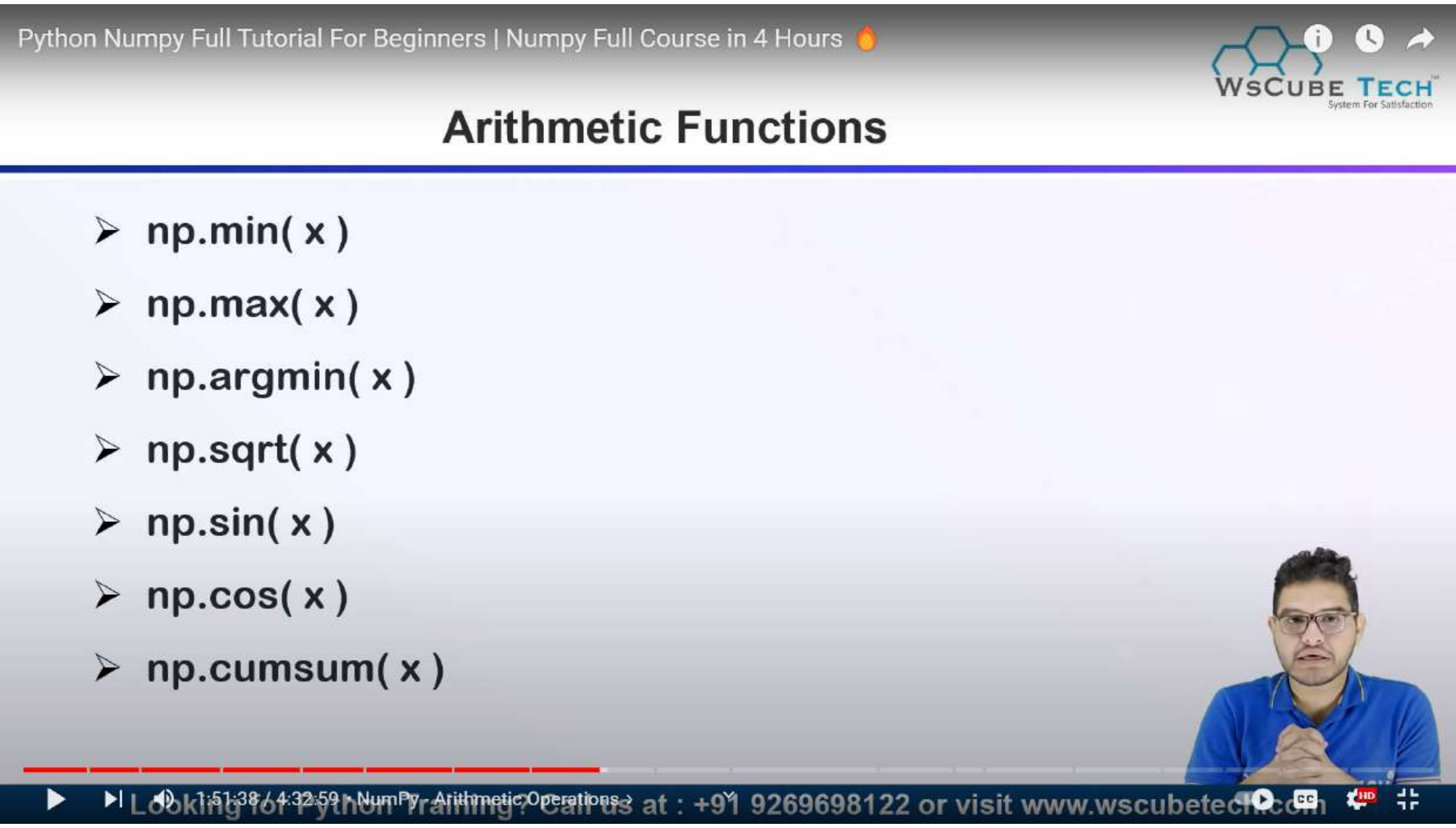
[ ]]

1	2	3
1	2	3

+

1	2	3
1	2	3

=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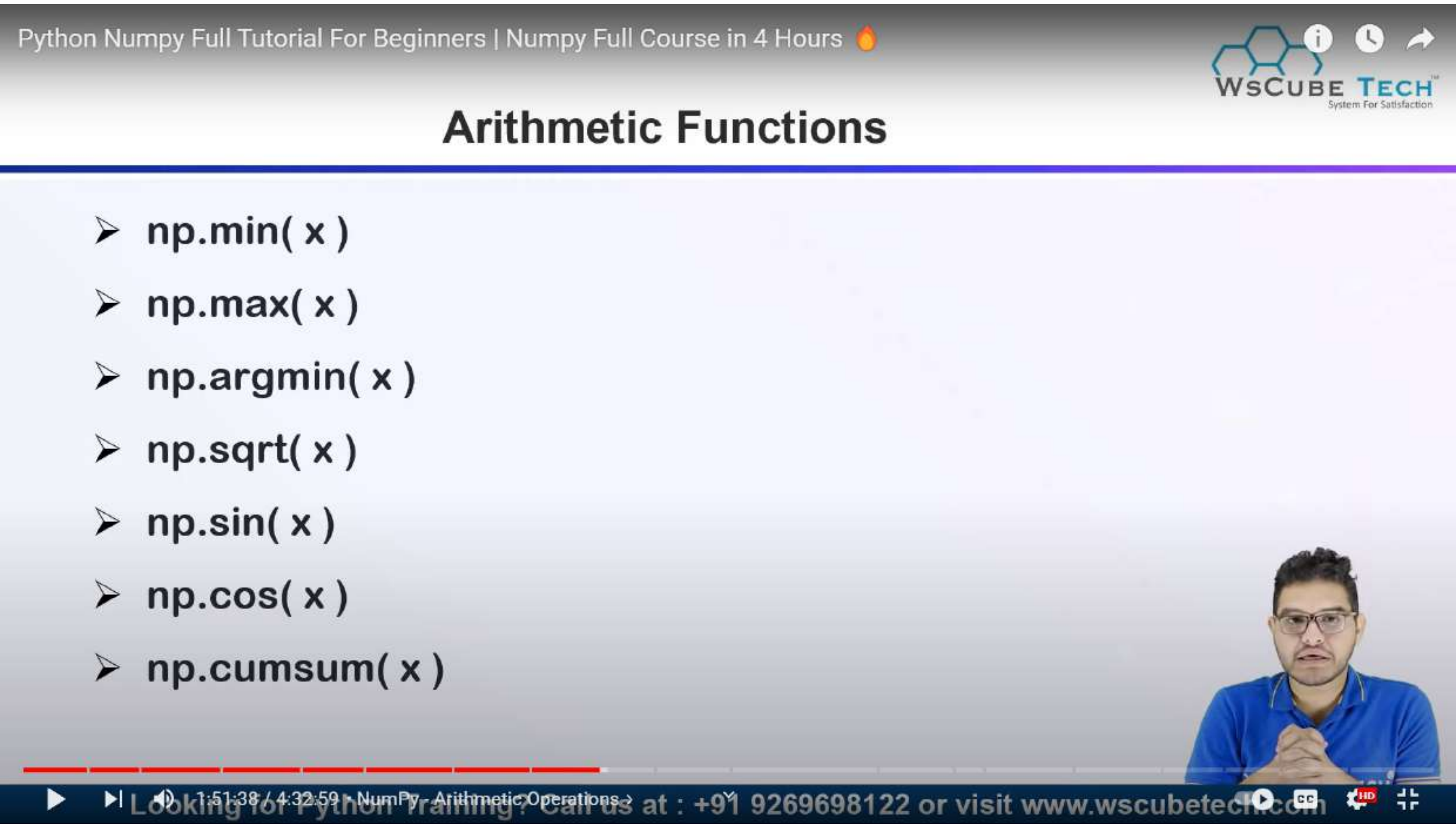
Arithmetic Functions

- np.min(x)
- np.max(x)
- np.argmin(x)
- np.sqrt(x)
- np.sin(x)
- np.cos(x)
- np.cumsum(x)



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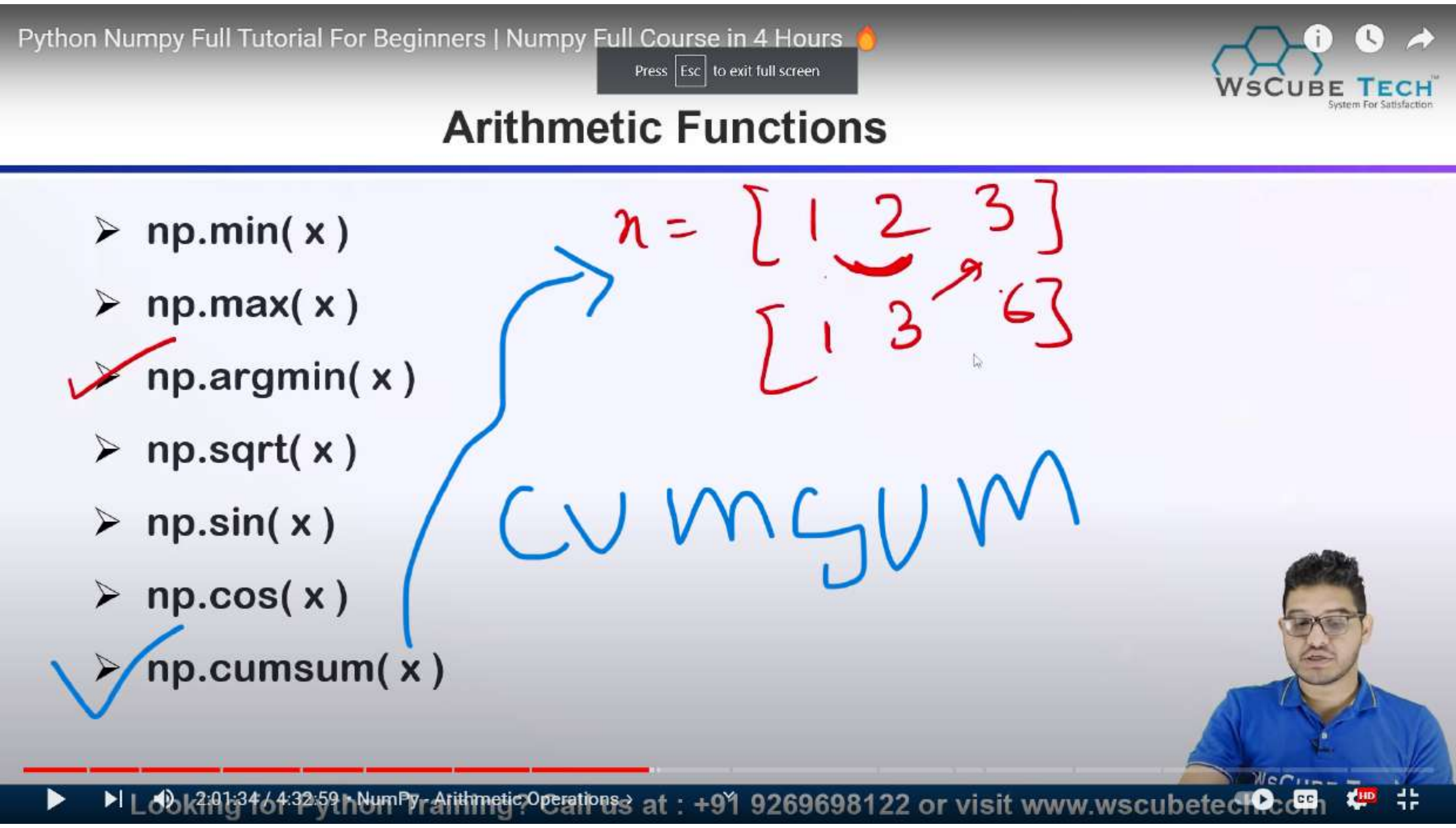

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Arithmetic Functions

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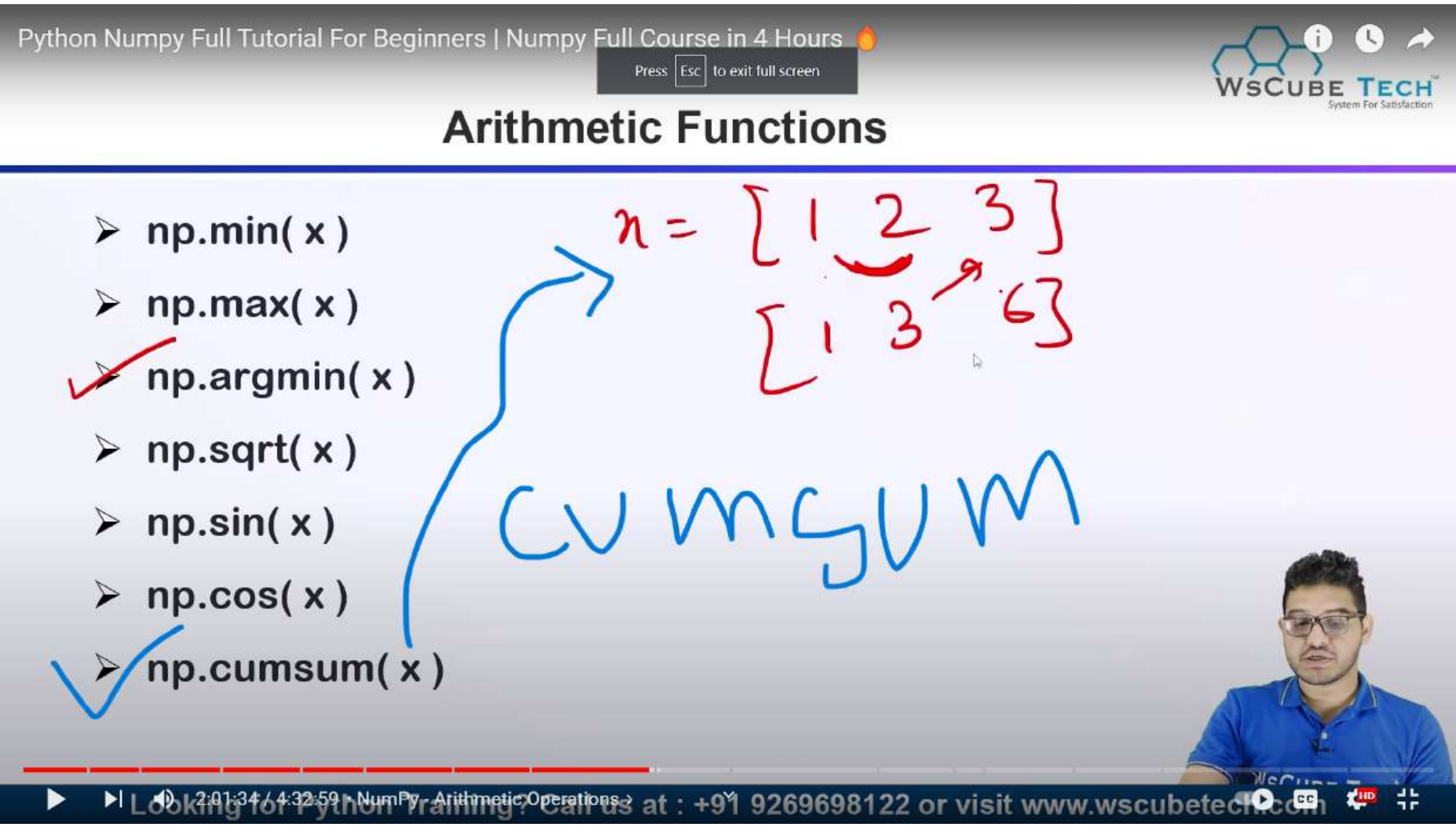
- np.cos(x)
- ✓ np.cumsum(x)

x = [1 2 3]

[1 3 6]

cumsum

2:01:34 / 4:32:59 • NumPy - Arithmetic Operations



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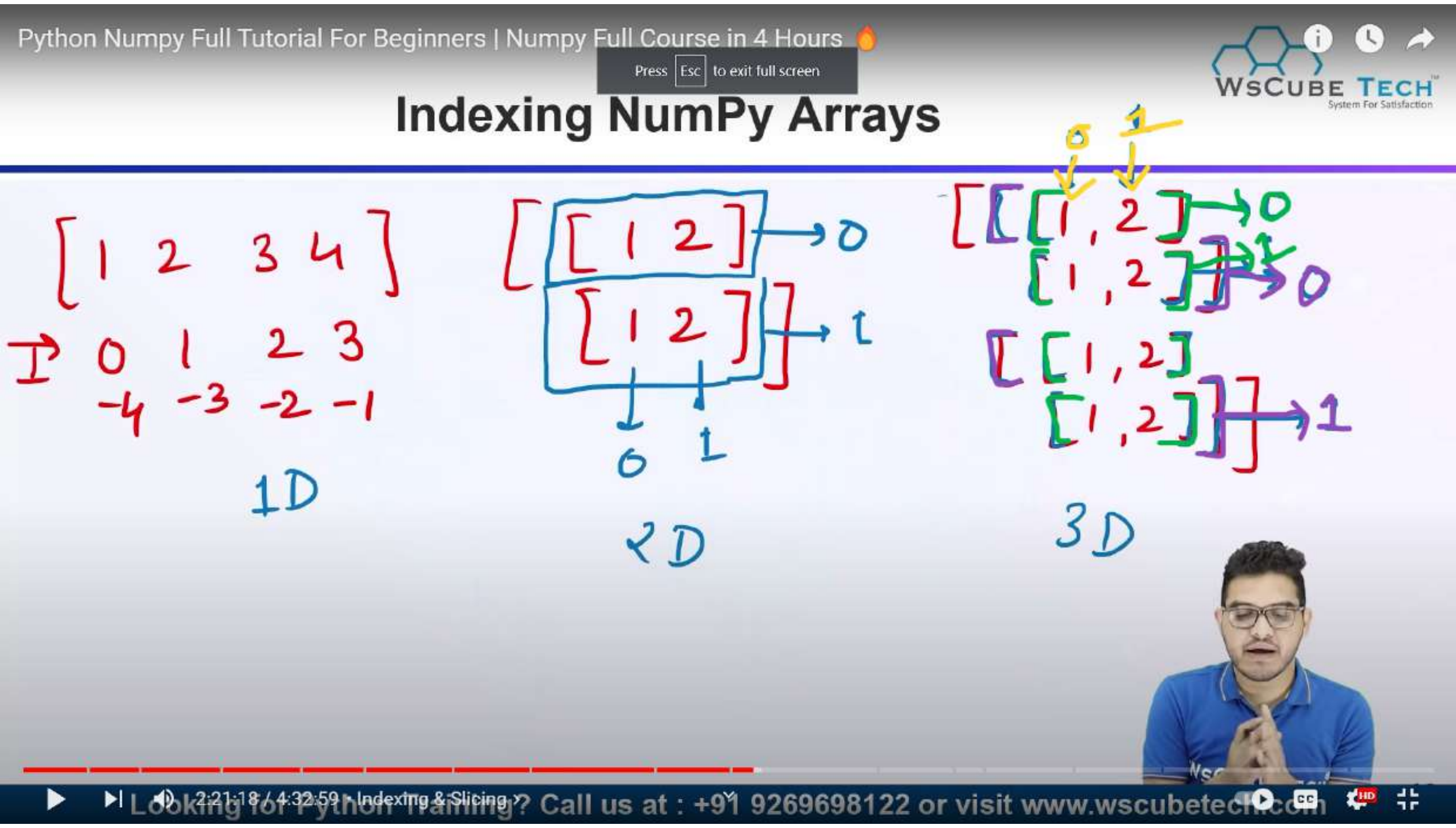
$x = [1\ \ 2\ \ 3]$

$[1\ \ 3\ \ 6]$

cumsum



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Indexing NumPy Arrays

2:21:18 / 4:32:59 • Indexing & Slicing >

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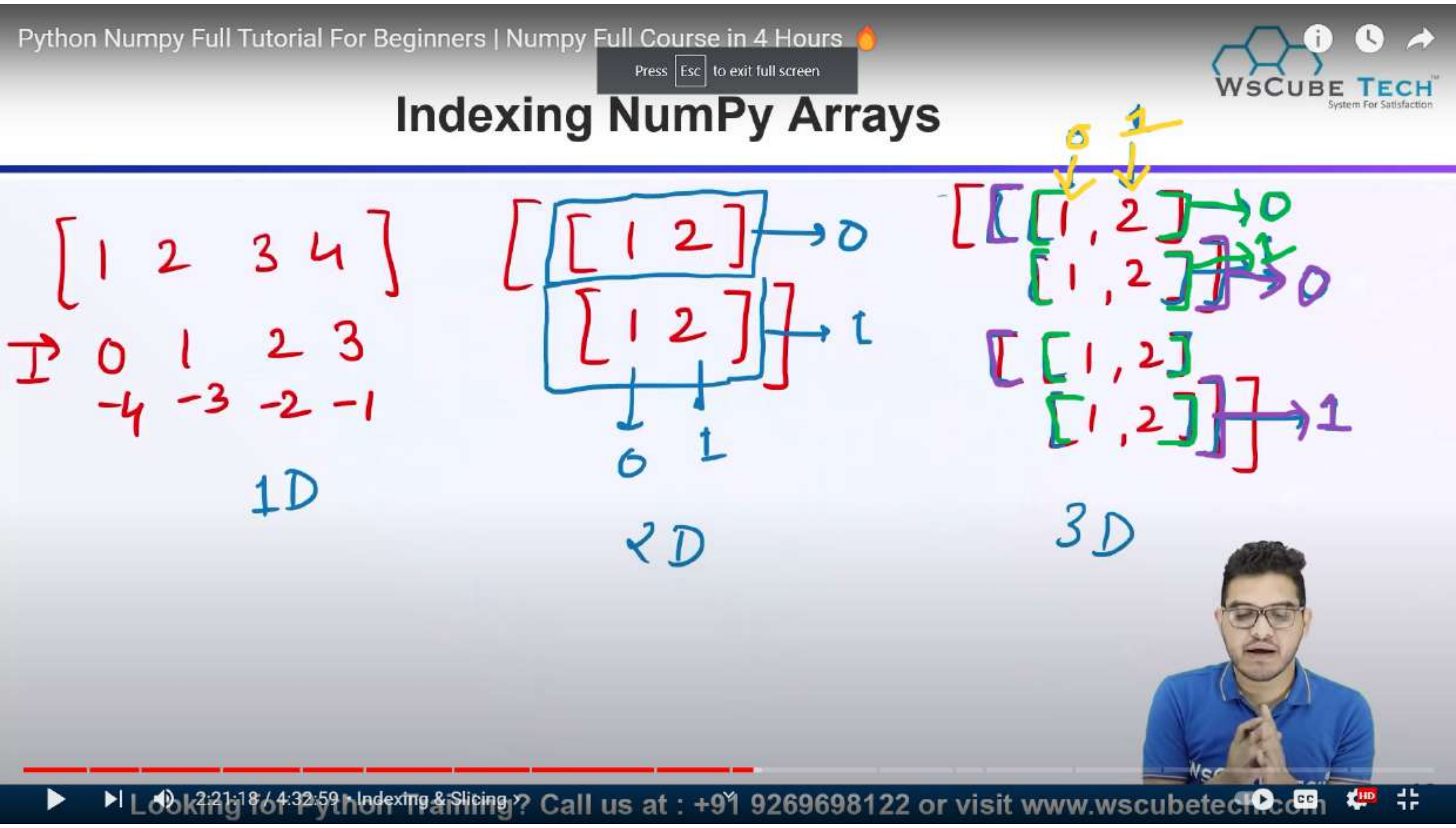

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Indexing NumPy Arrays

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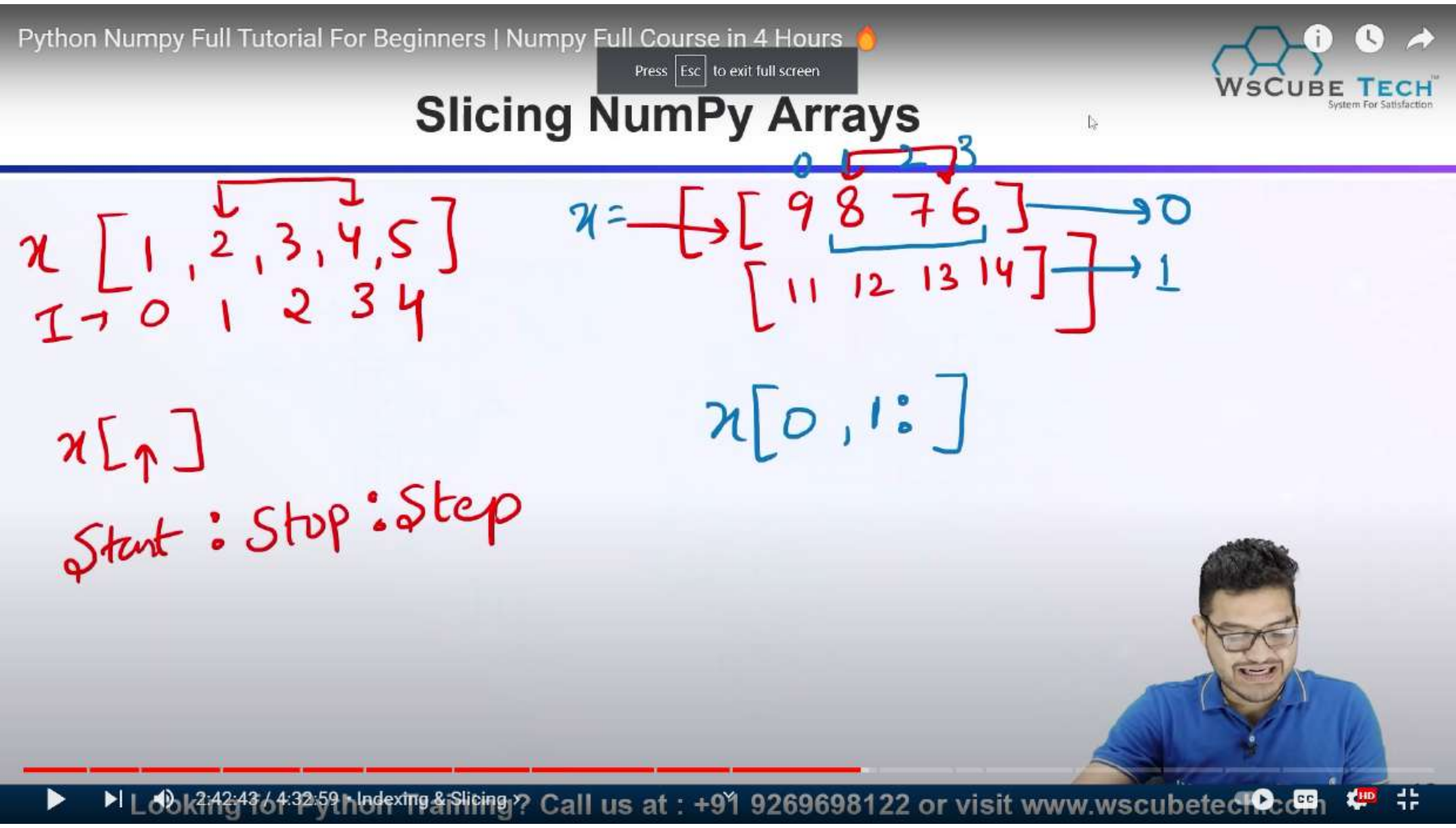

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Slicing NumPy Arrays

x [1 , 2 , 3 , 4 , 5]

I → 0 1 2 3 4

x[↑]

Start : Stop : Step

0 1 2 3

x = [[9 8 7 6] → 0

[11 12 13 14]] → 1

x[0 , 1:]

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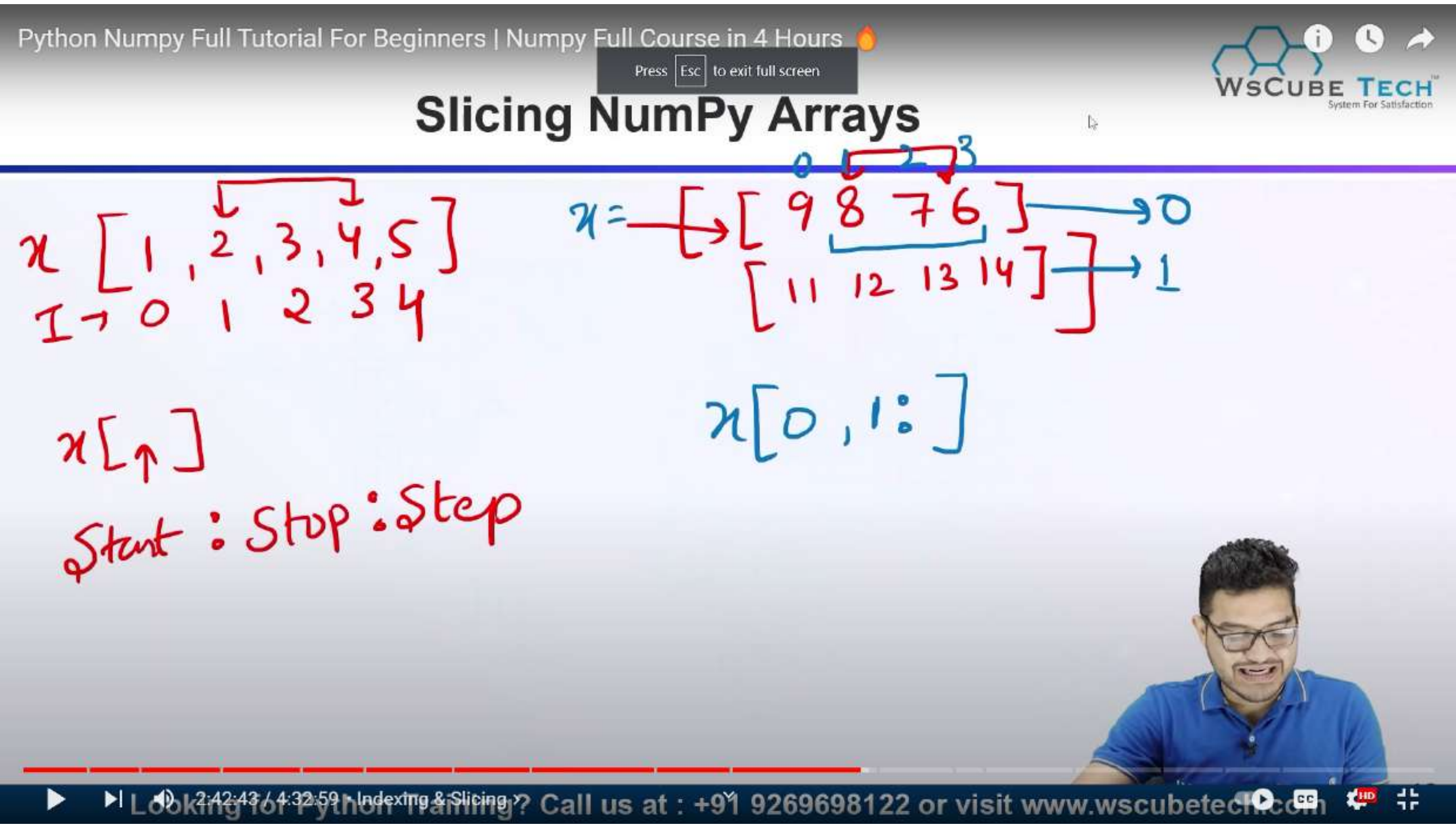

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0 1 2 3

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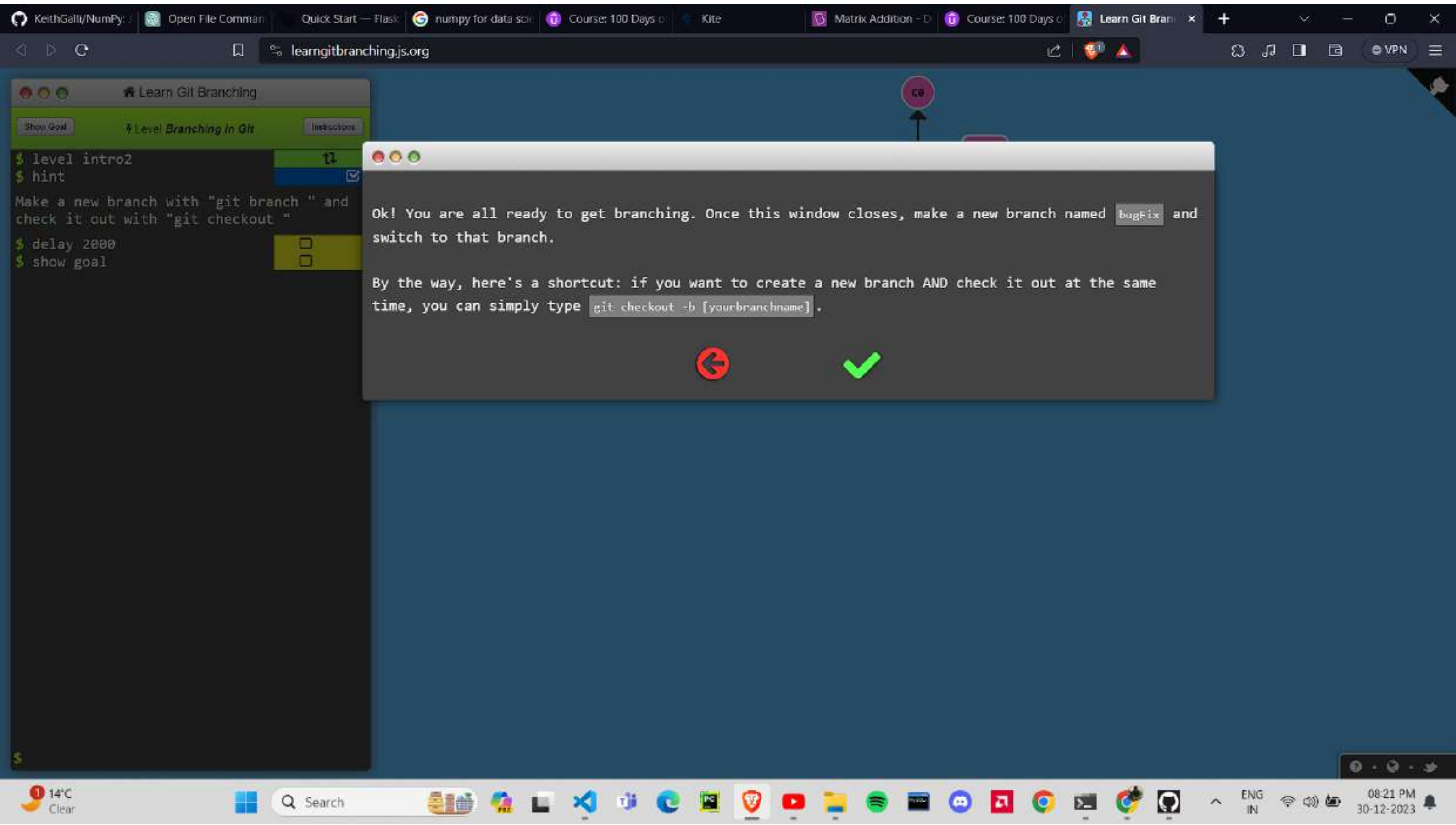
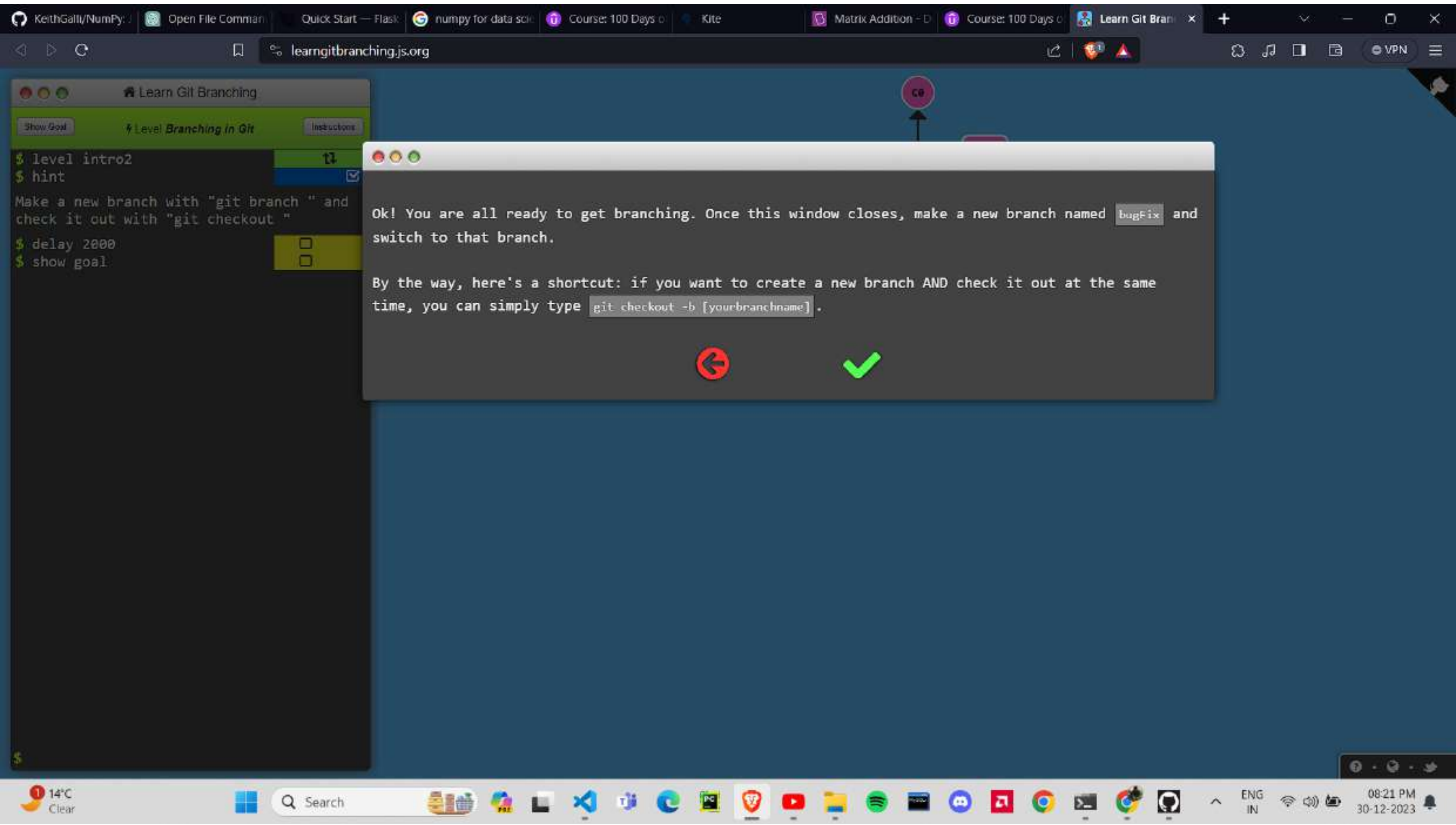
2:42:43 / 4:32:59 • Indexing & Slicing ›



```
$ level intro2
$ hint
Make a new branch with "git branch " and
check it out with "git checkout "
$ delay 2000
$ show goal
```

Ok! You are all ready to get branching. Once this window closes, make a new branch named `bugFix` and switch to that branch.

By the way, here's a shortcut: if you want to create a new branch AND check it out at the same time, you can simply type `git checkout -b [yourbranchname]`.



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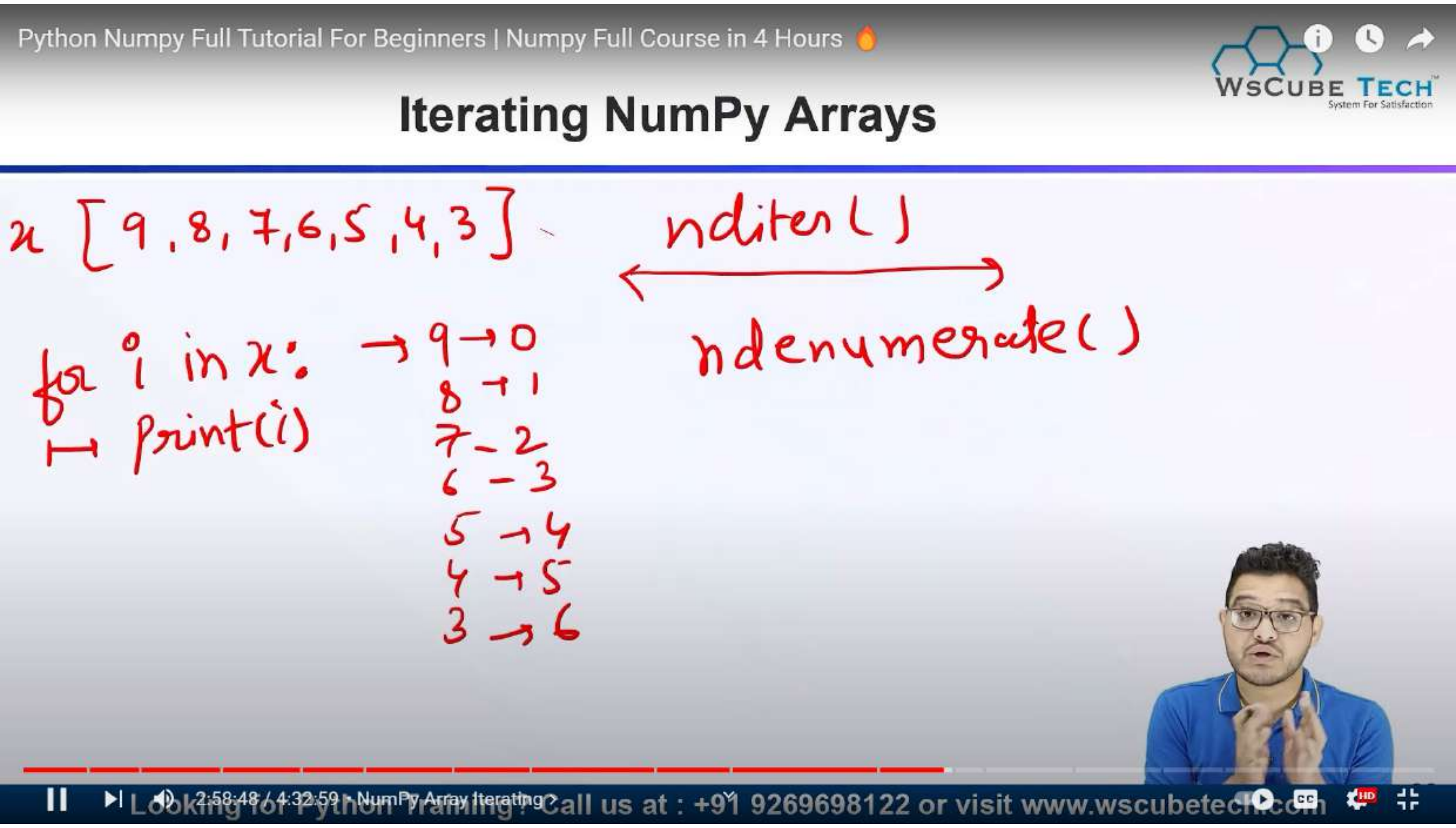

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2:58:48 / 4:32:59 • NumPy Array Iterating >

Iterating NumPy Arrays

```
x [9, 8, 7, 6, 5, 4, 3]

for i in x:
    print(i)
```

→ 9 → 0
8 → 1
7 – 2
6 – 3
5 → 4
4 → 5
3 → 6

nditer( )

⟷

ndenumerate( )

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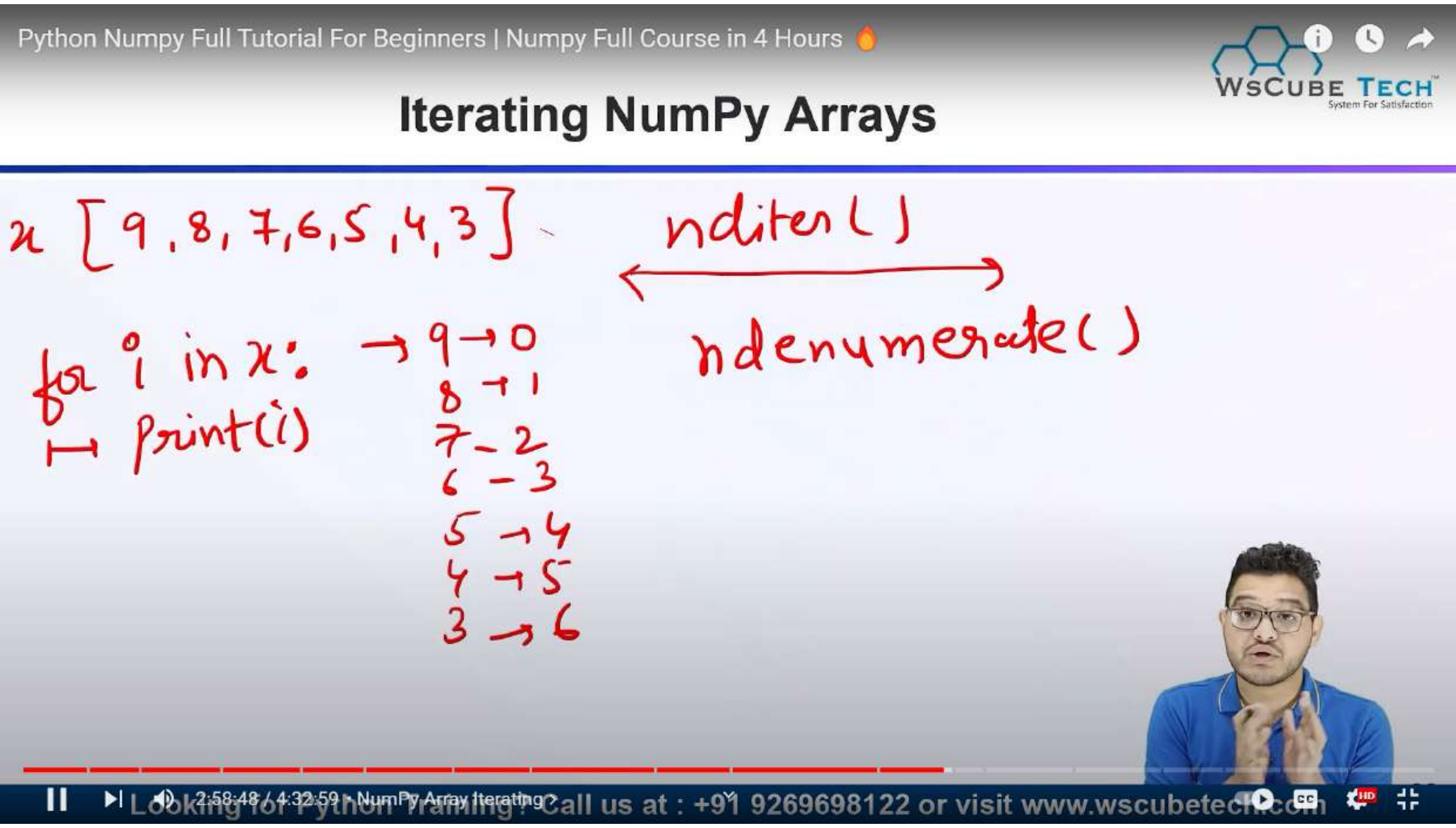

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nditer()

ndenumerate()

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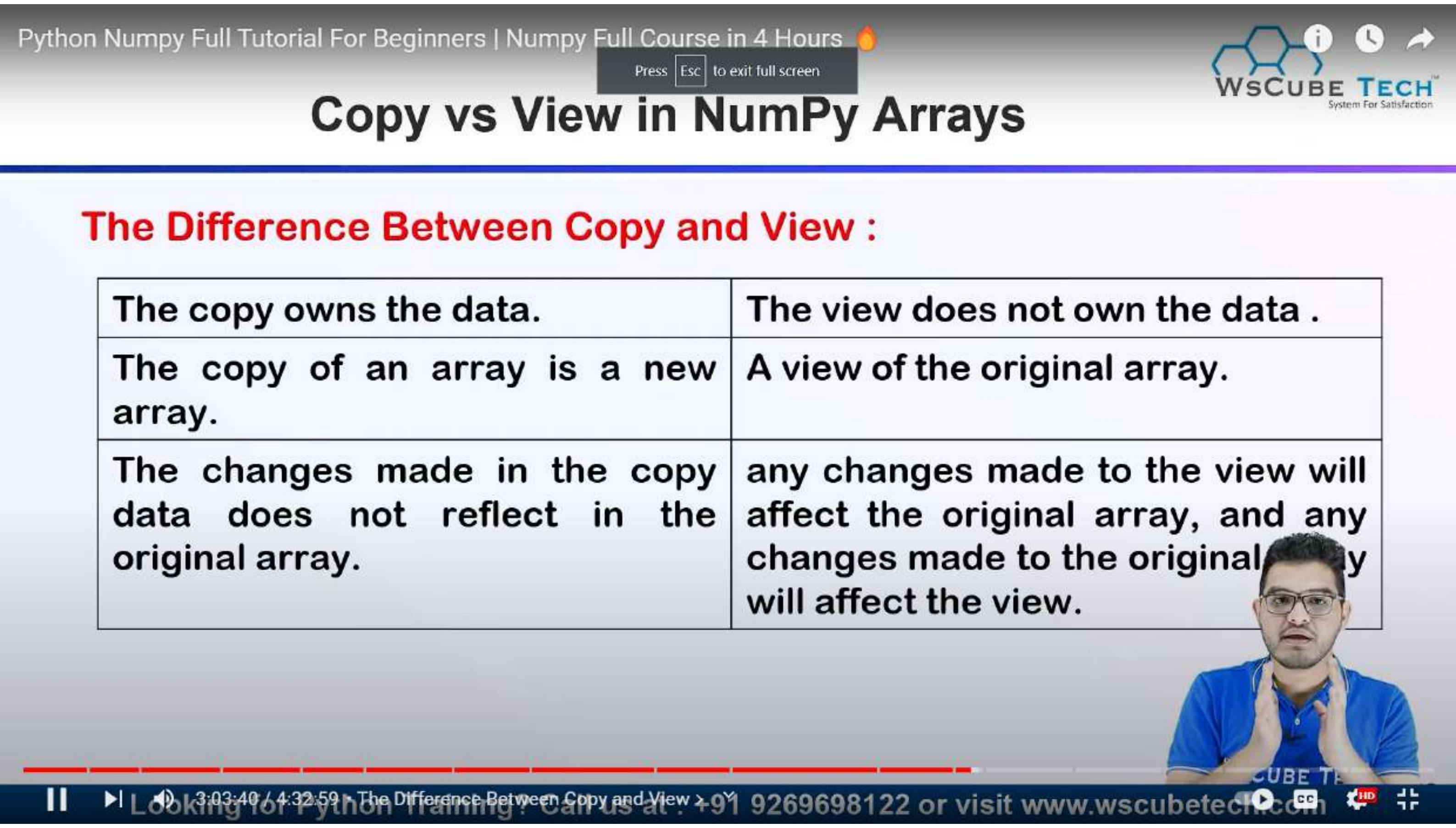

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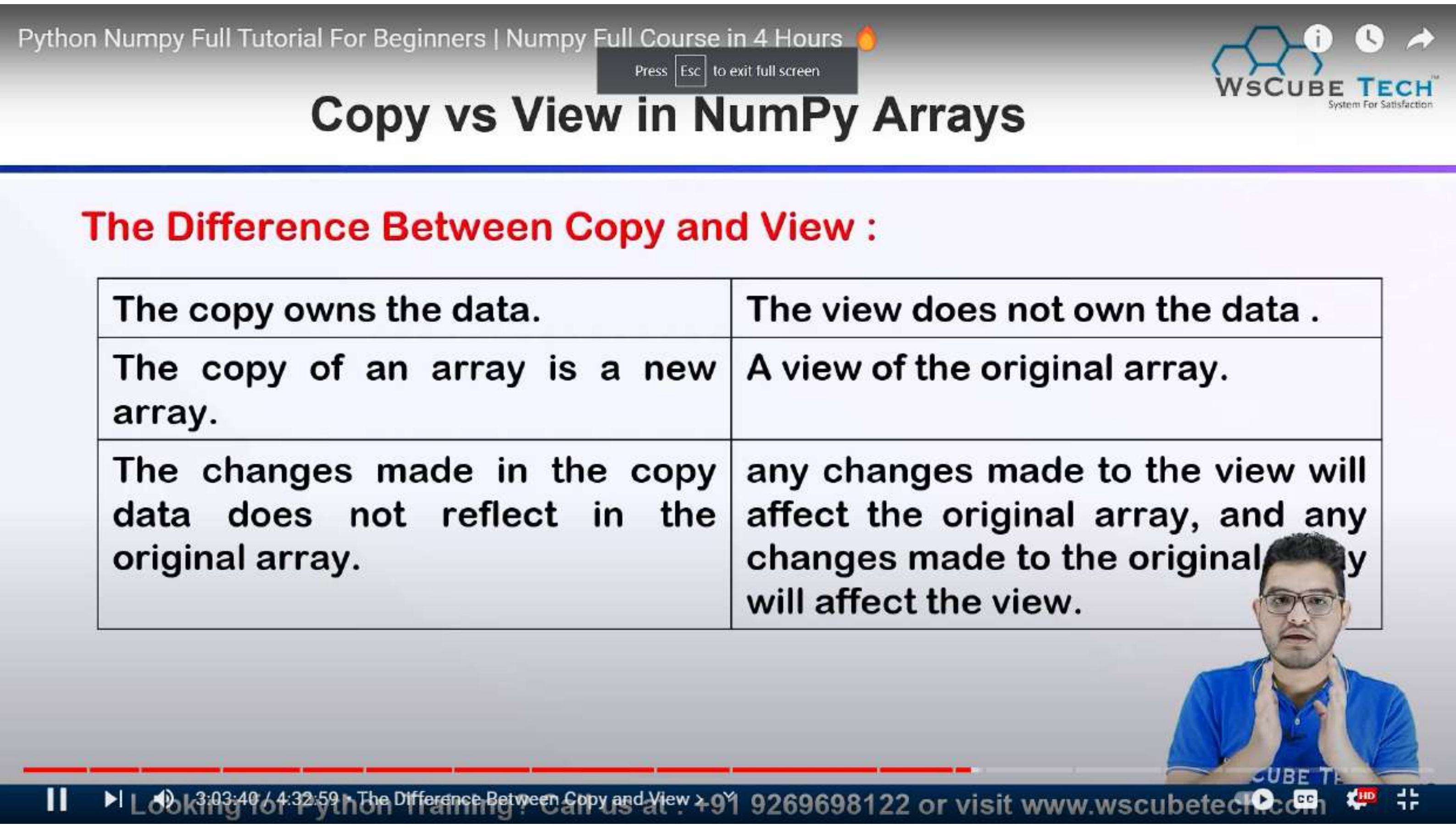
Copy vs View in NumPy Arrays

The Difference Between Copy and View :

The copy owns the data.	The view does not own the data .
The copy of an array is a new array.	A view of the original array.
The changes made in the copy data does not reflect in the original array.	any changes made to the view will affect the original array, and any changes made to the original array will affect the view.



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3:03:40 / 4:32:59 • The Difference Between Copy and View >

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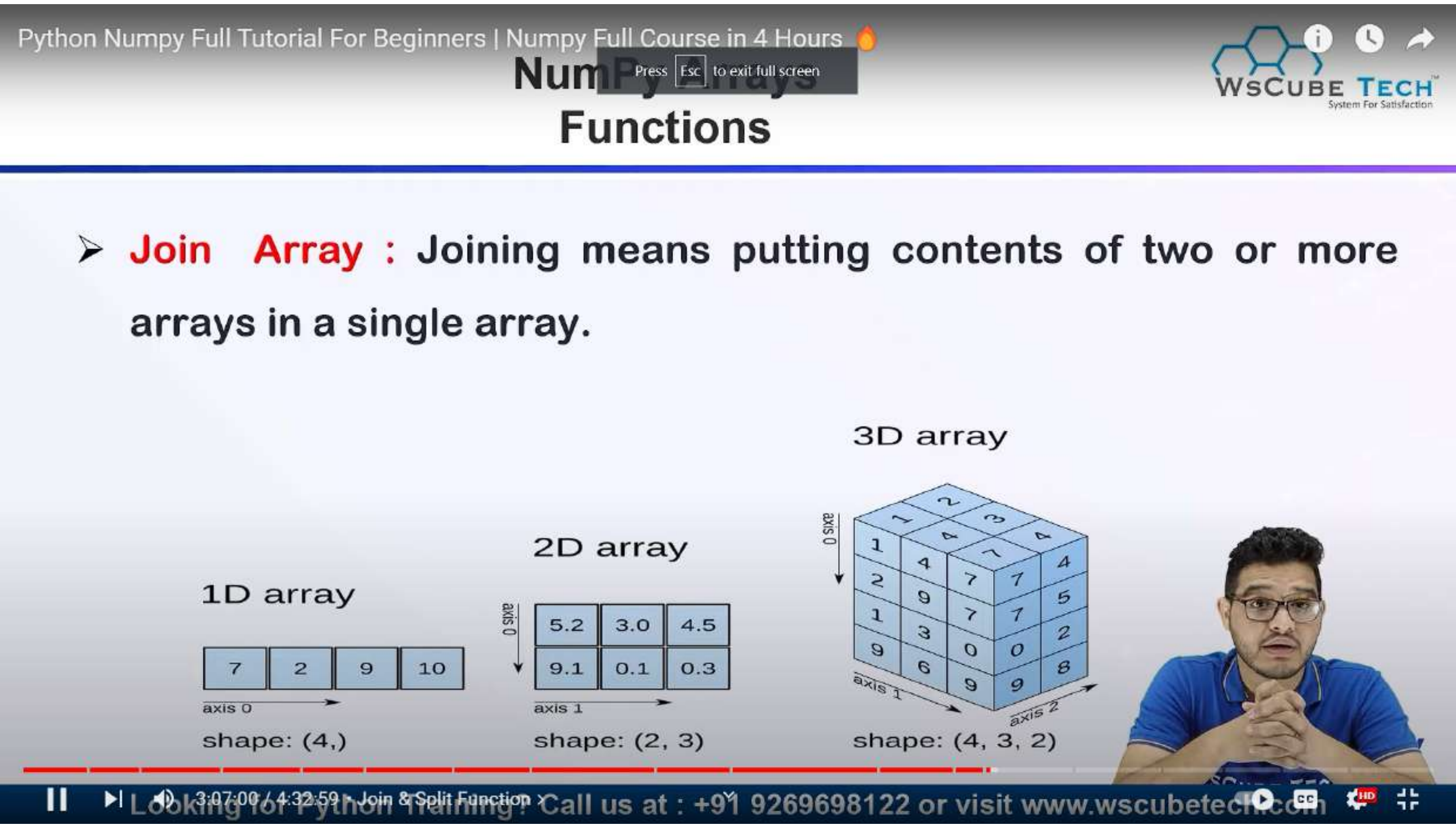

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NumPy Arrays Functions

- **Join Array :** Joining means putting contents of two or more arrays in a single array.

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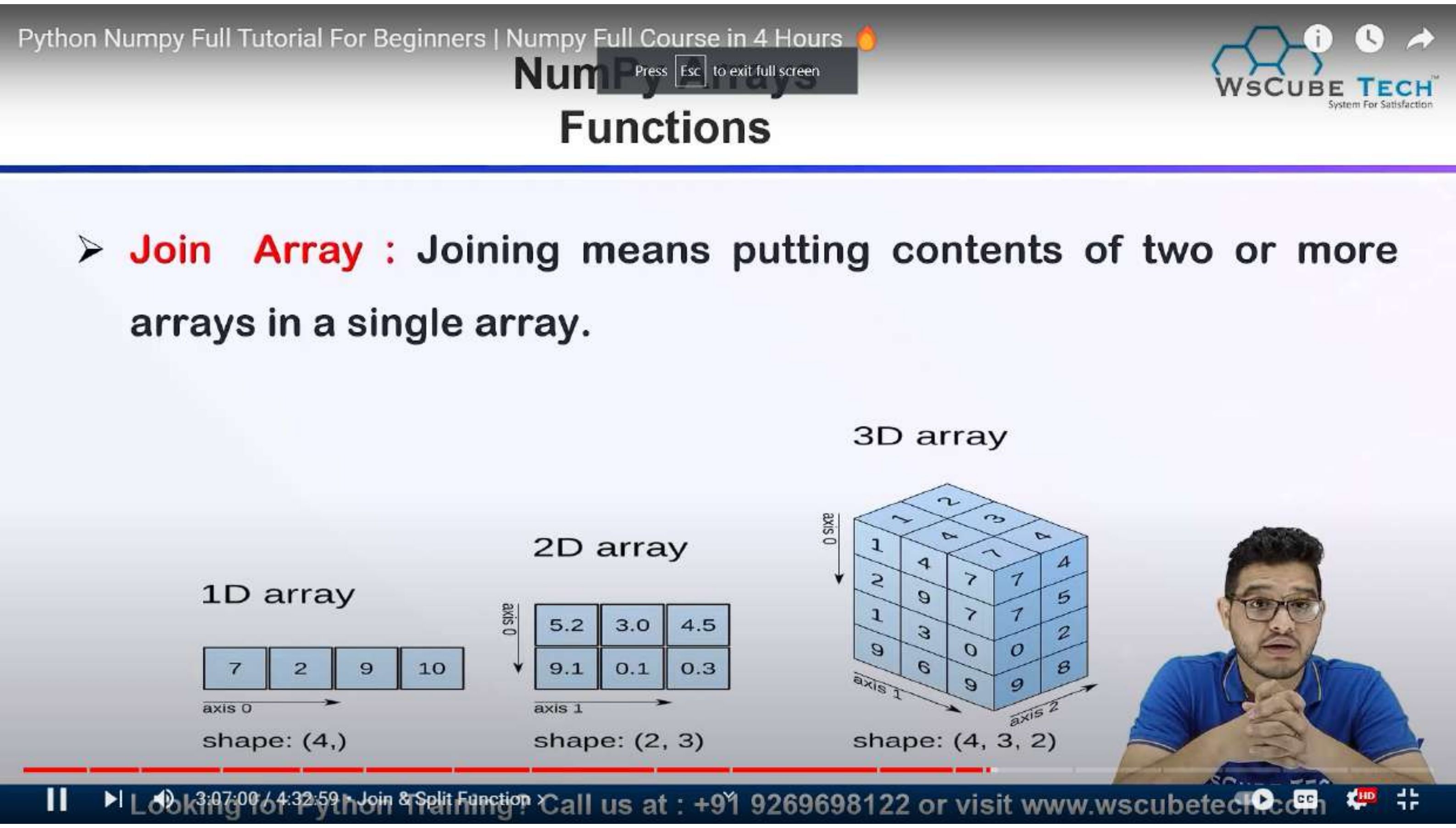

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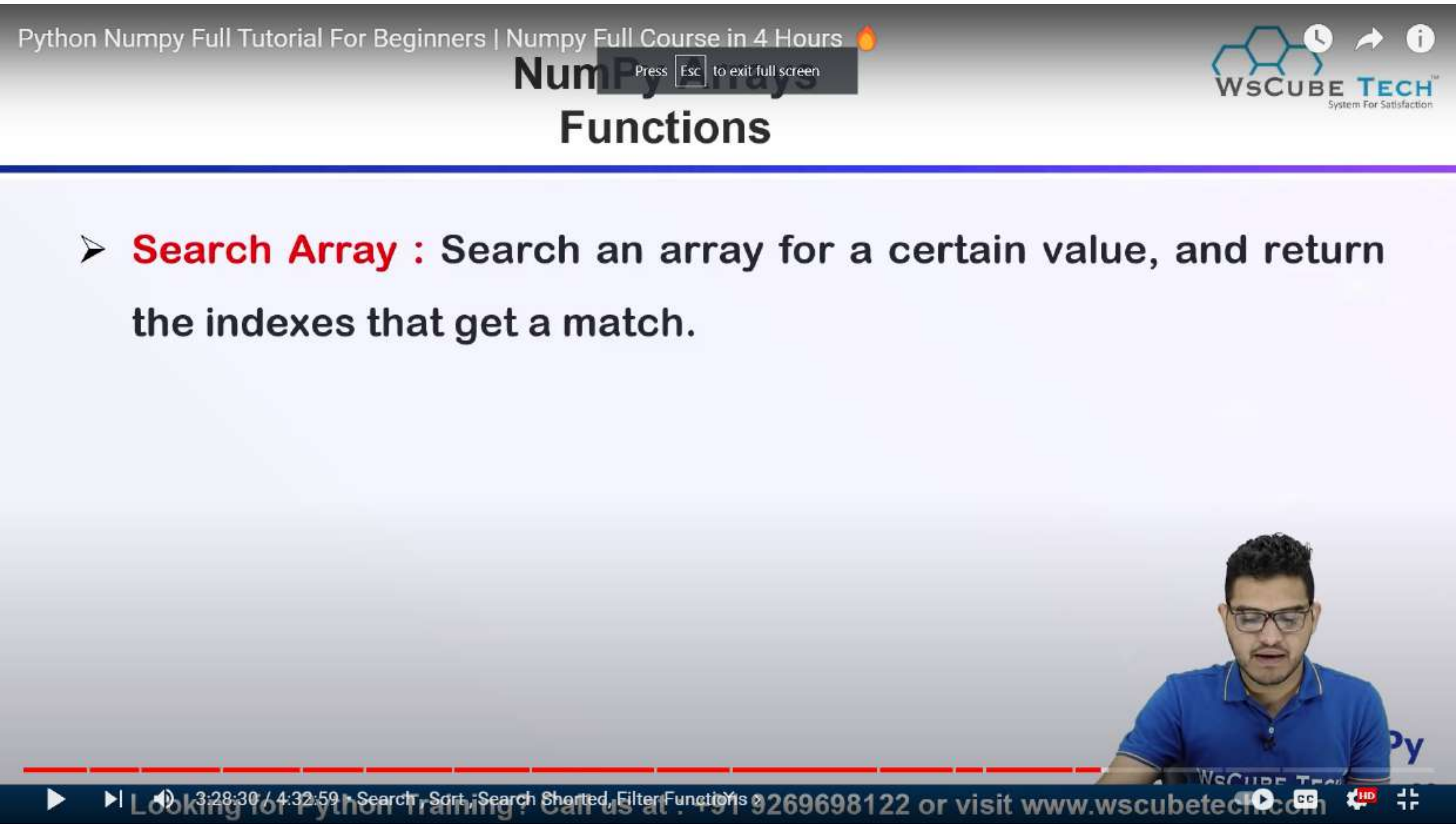
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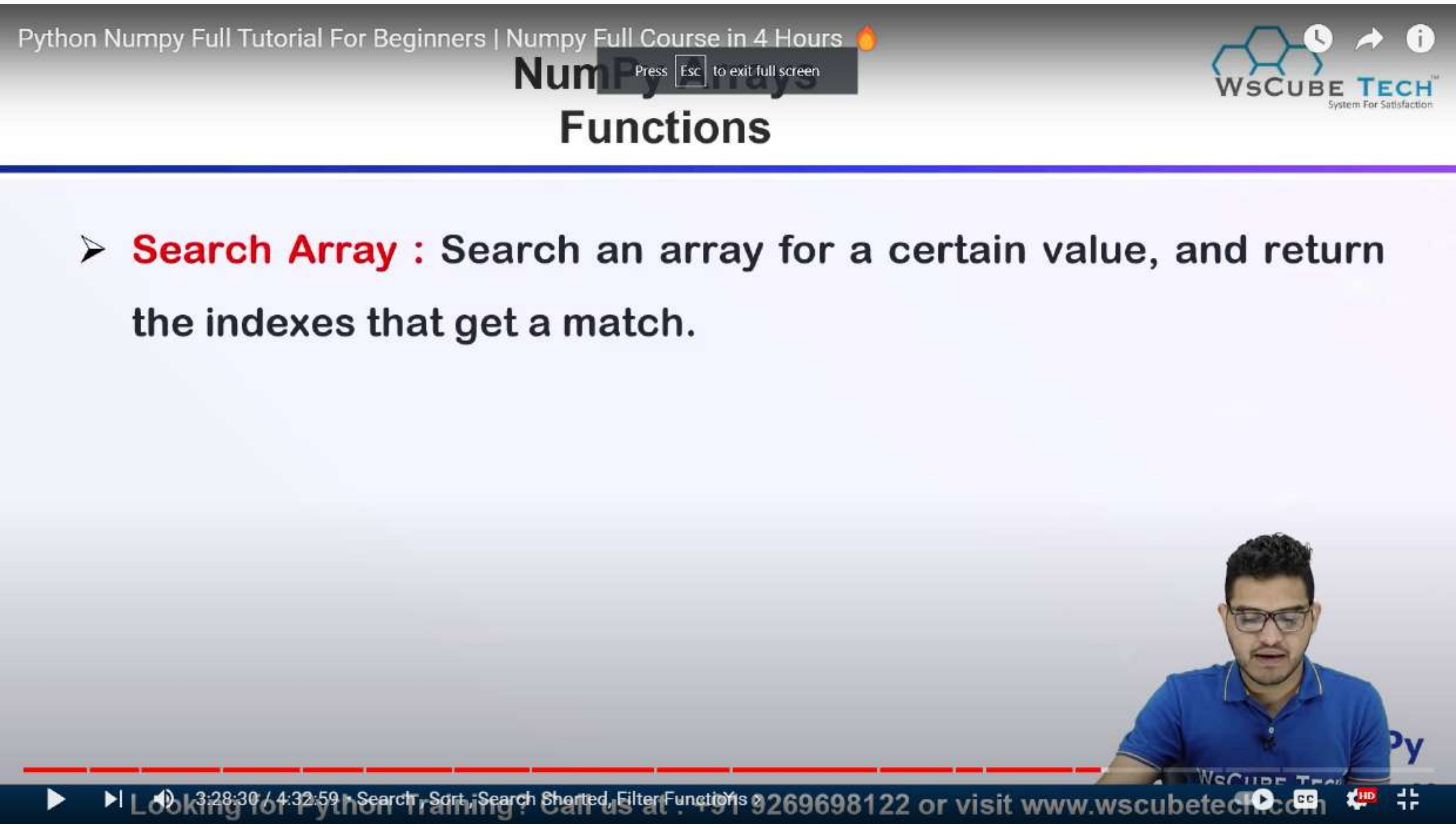
3:28:30 / 4:32:59 • Search, Sort, Search Shorted, Filter Functions ›

NumPy Arrays Functions

- **Search Array :** Search an array for a certain value, and return the indexes that get a match.



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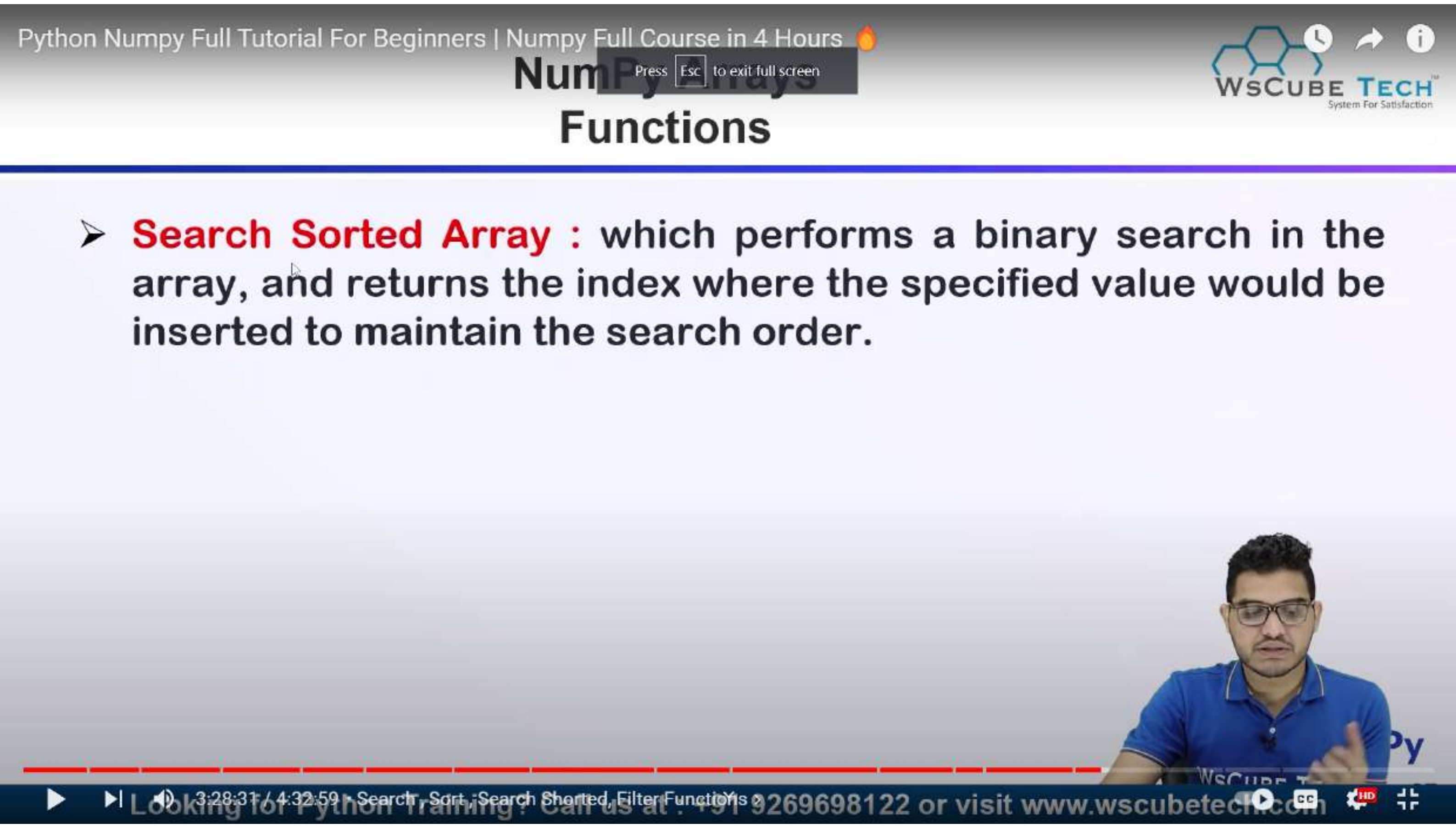

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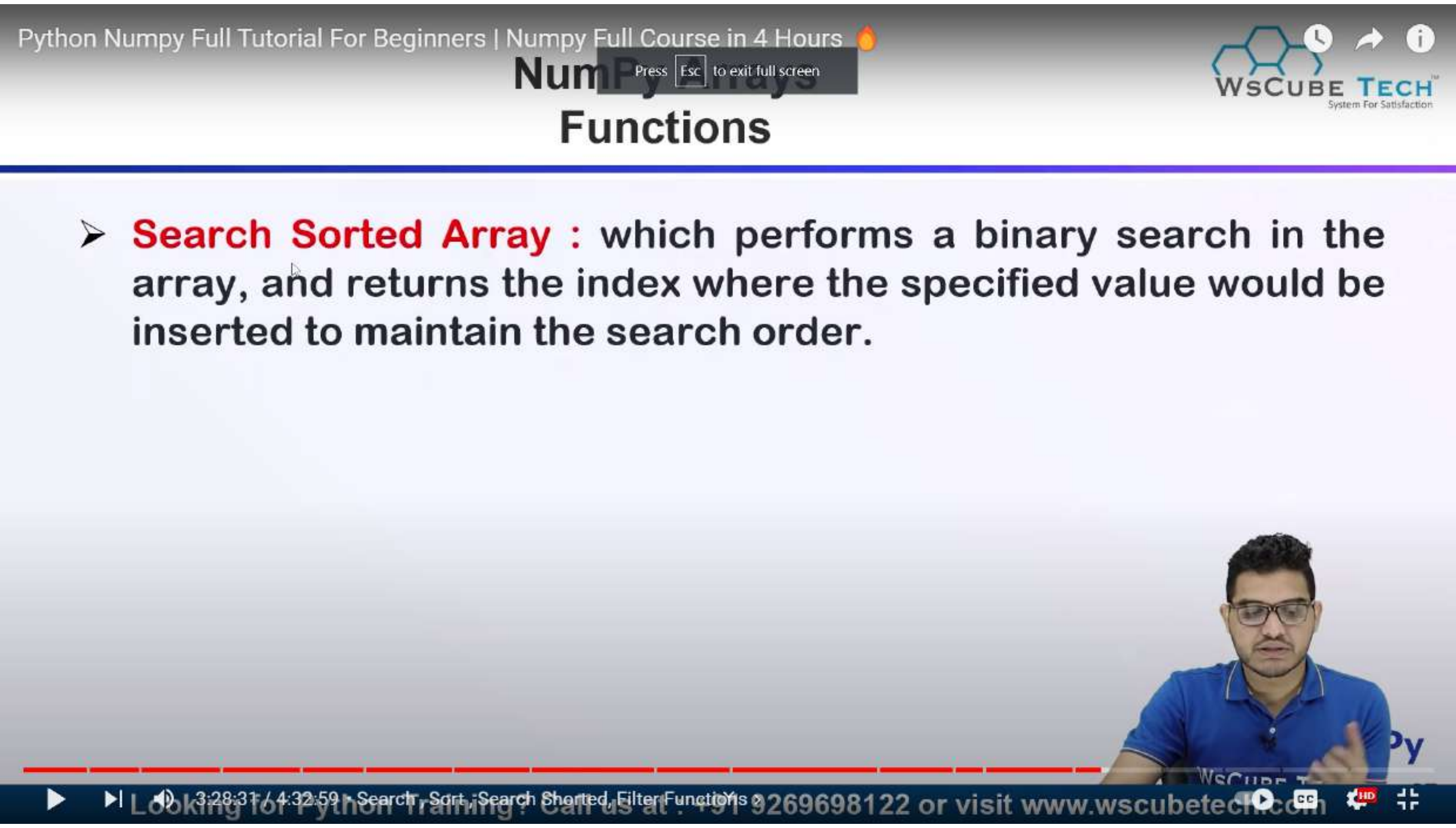
NumPy Arrays Functions

- **Search Sorted Array :** which performs a binary search in the array, and returns the index where the specified value would be inserted to maintain the search order.

3:28:31 / 4:32:59 • Search, Sort, Search Shorted, Filter Functions ›



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3:28:31 / 4:32:59 • Search, Sort, Search Shorted, Filter Functions ›
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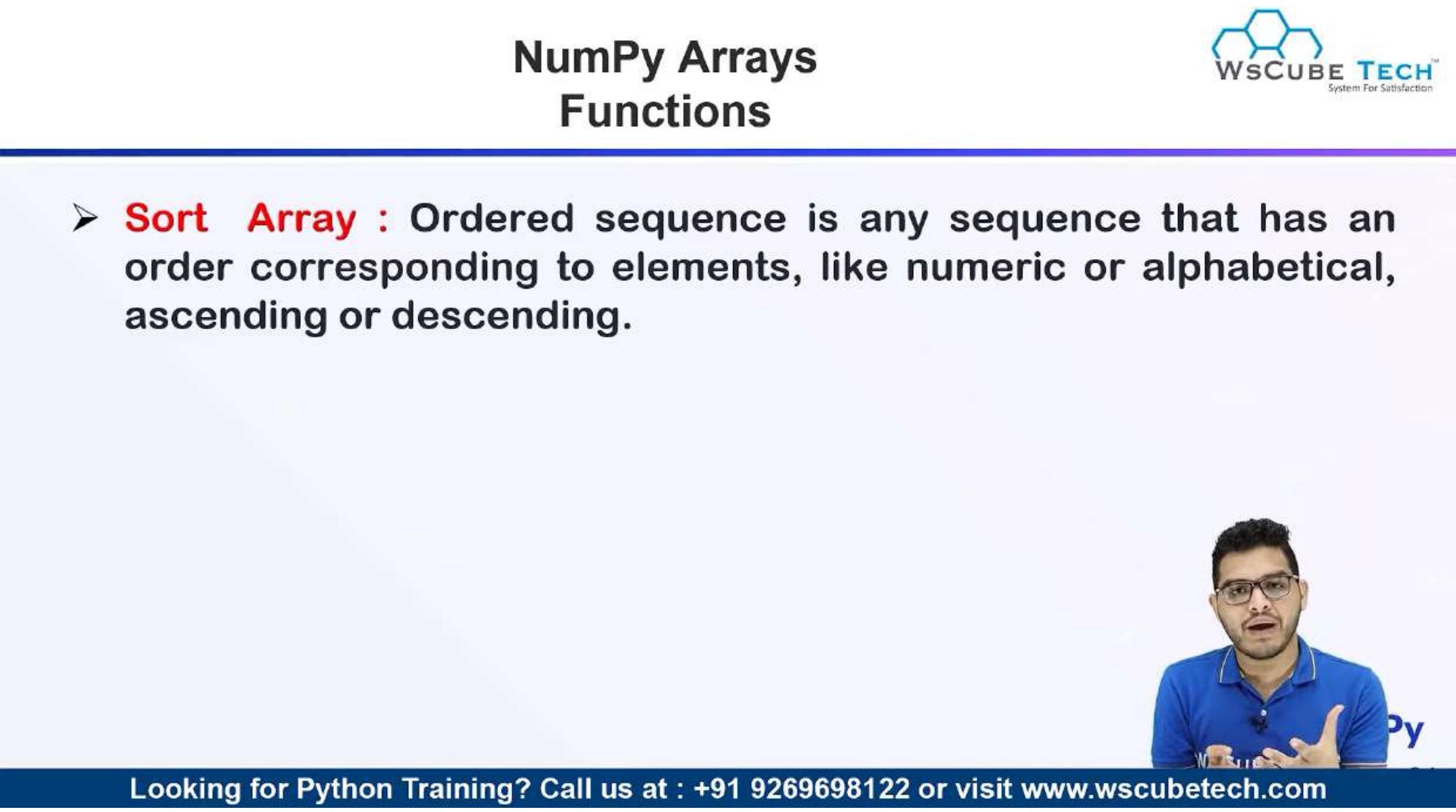
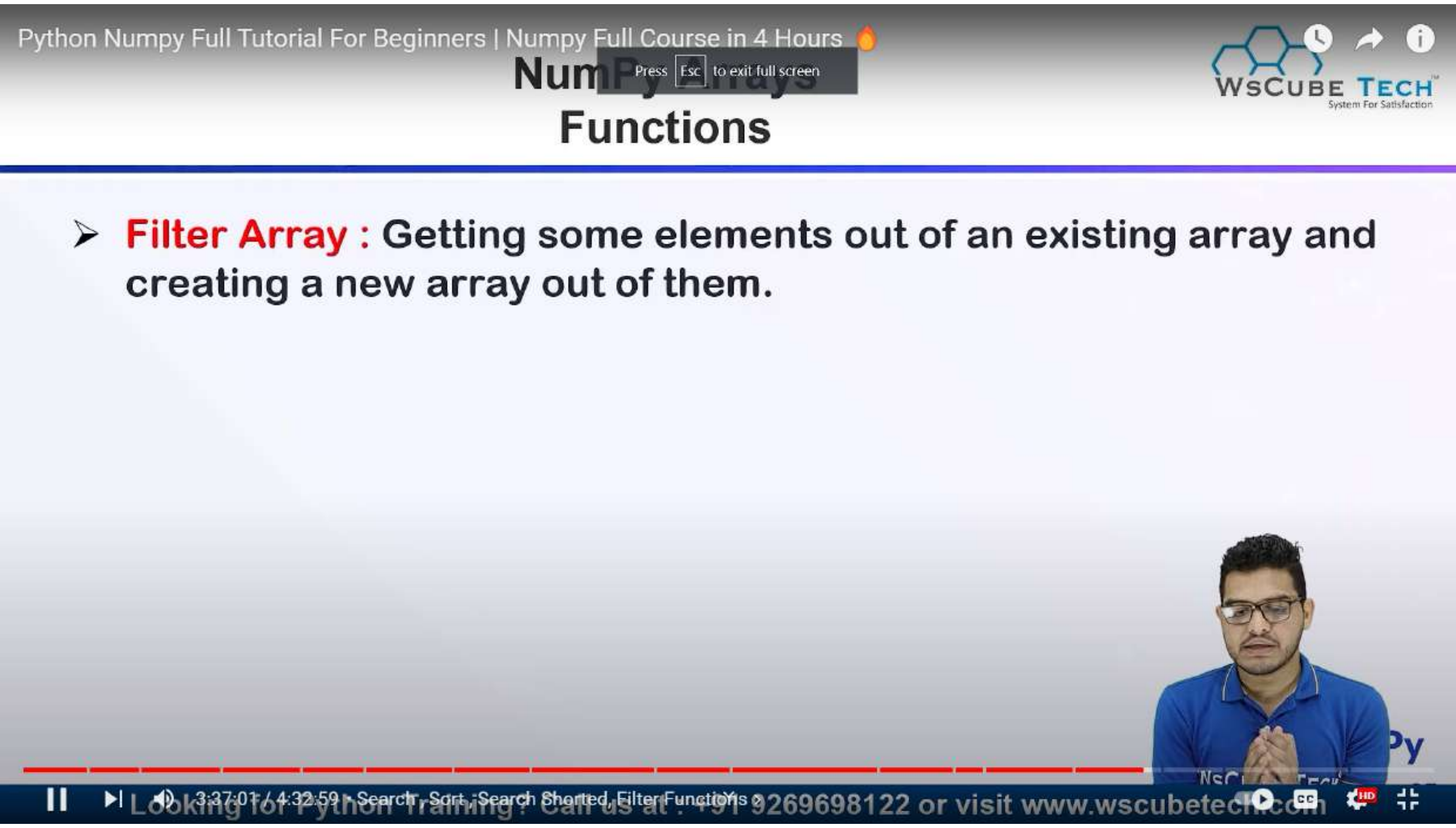


NumPy Arrays Functions

- **Sort Array :** Ordered sequence is any sequence that has an order corresponding to elements, like numeric or alphabetical, ascending or descending.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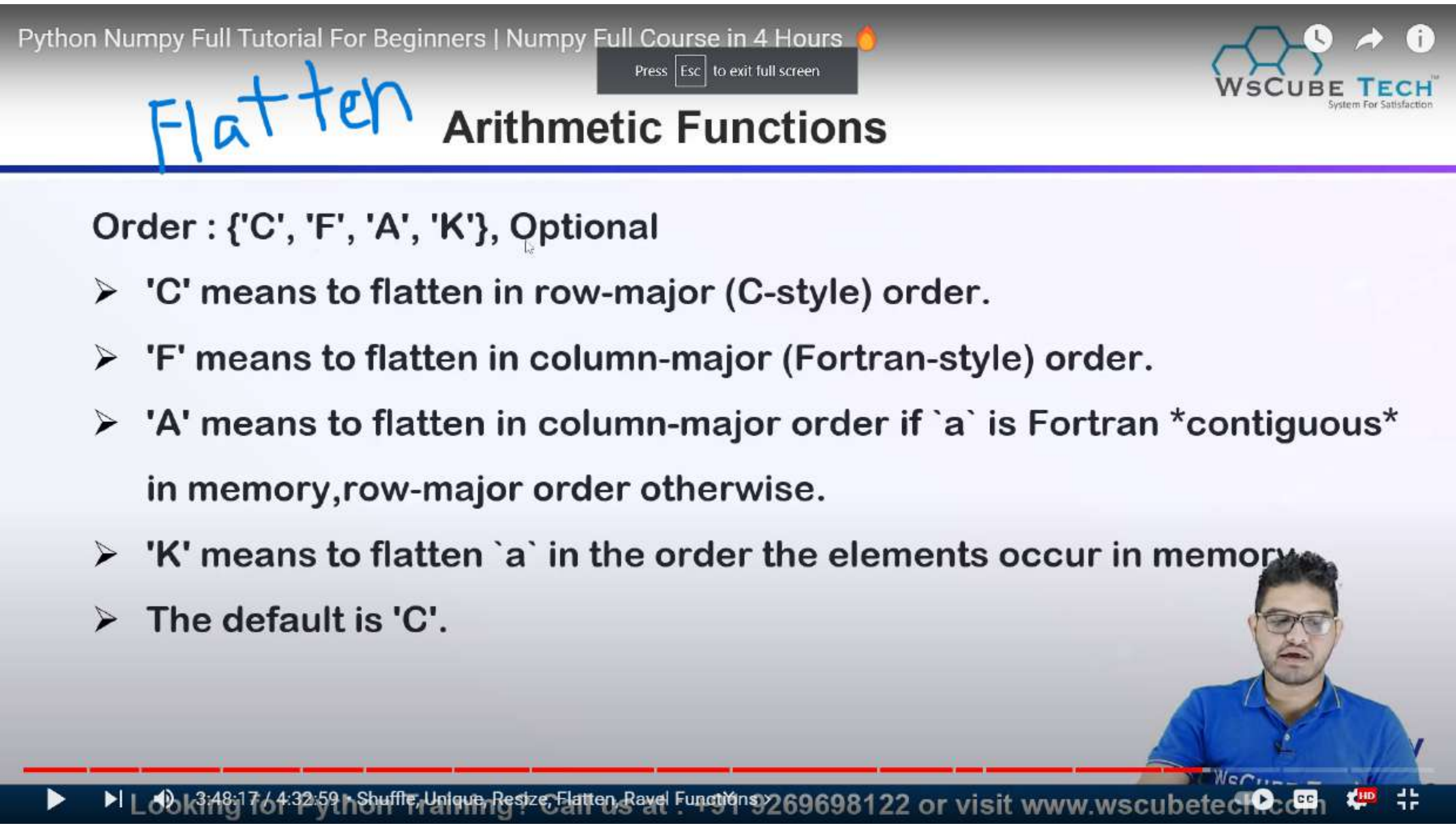
3:37:01 / 4:32:59 • Search, Sort, Search Shorted, Filter Functions ›

NumPy Arrays Functions

- **Filter Array :** Getting some elements out of an existing array and creating a new array out of them.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3:48:17 / 4:32:59 • Shuffle, Unique, Resize, Flatten, Ravel Functions >
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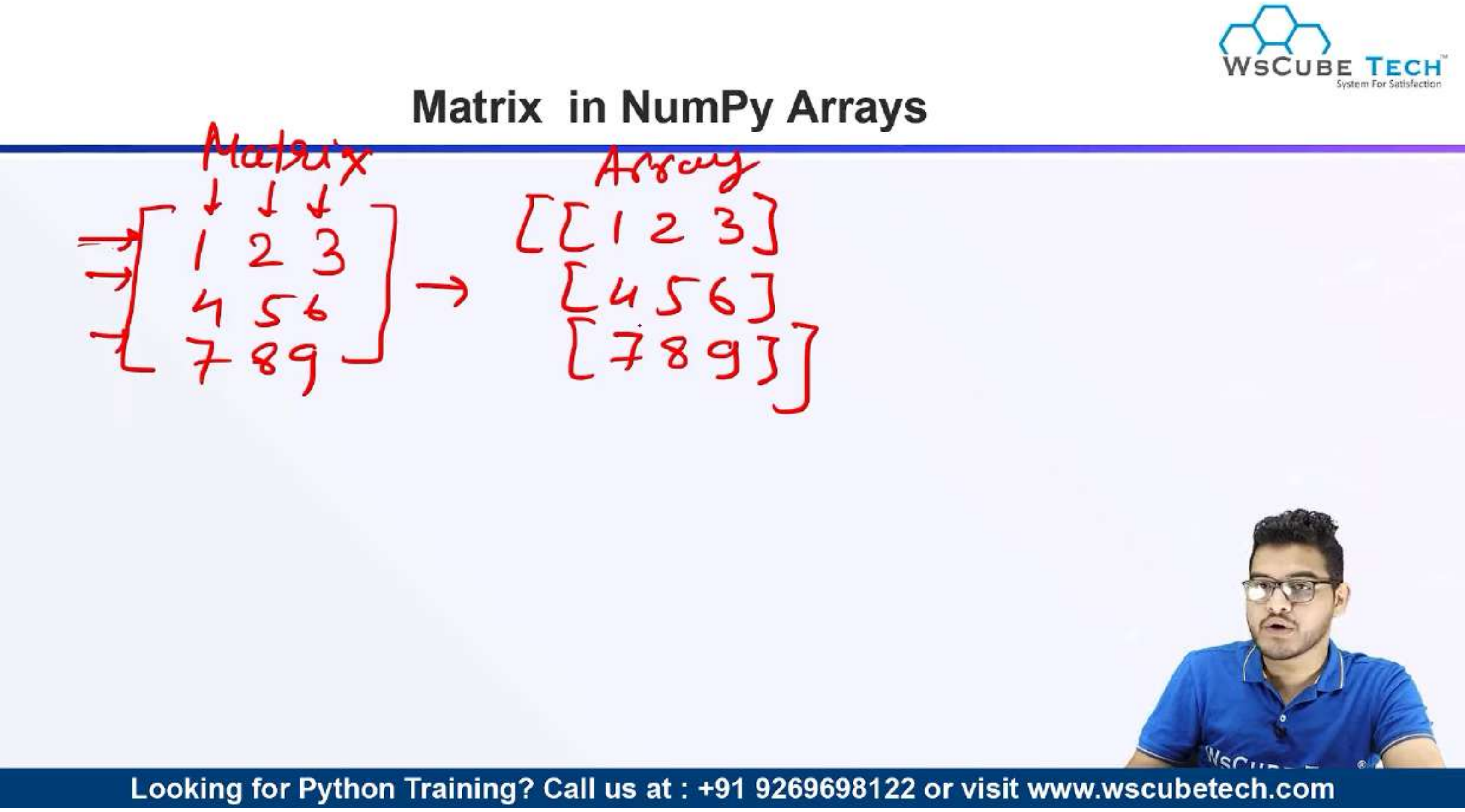
Flatten

Arithmetic Functions

Order : {'C', 'F', 'A', 'K'}, Optional

- 'C' means to flatten in row-major (C-style) order.
- 'F' means to flatten in column-major (Fortran-style) order.
- 'A' means to flatten in column-major order if \`a\` is Fortran *contiguous* in memory,row-major order otherwise.
- 'K' means to flatten \`a\` in the order the elements occur in memory.
- The default is 'C'.



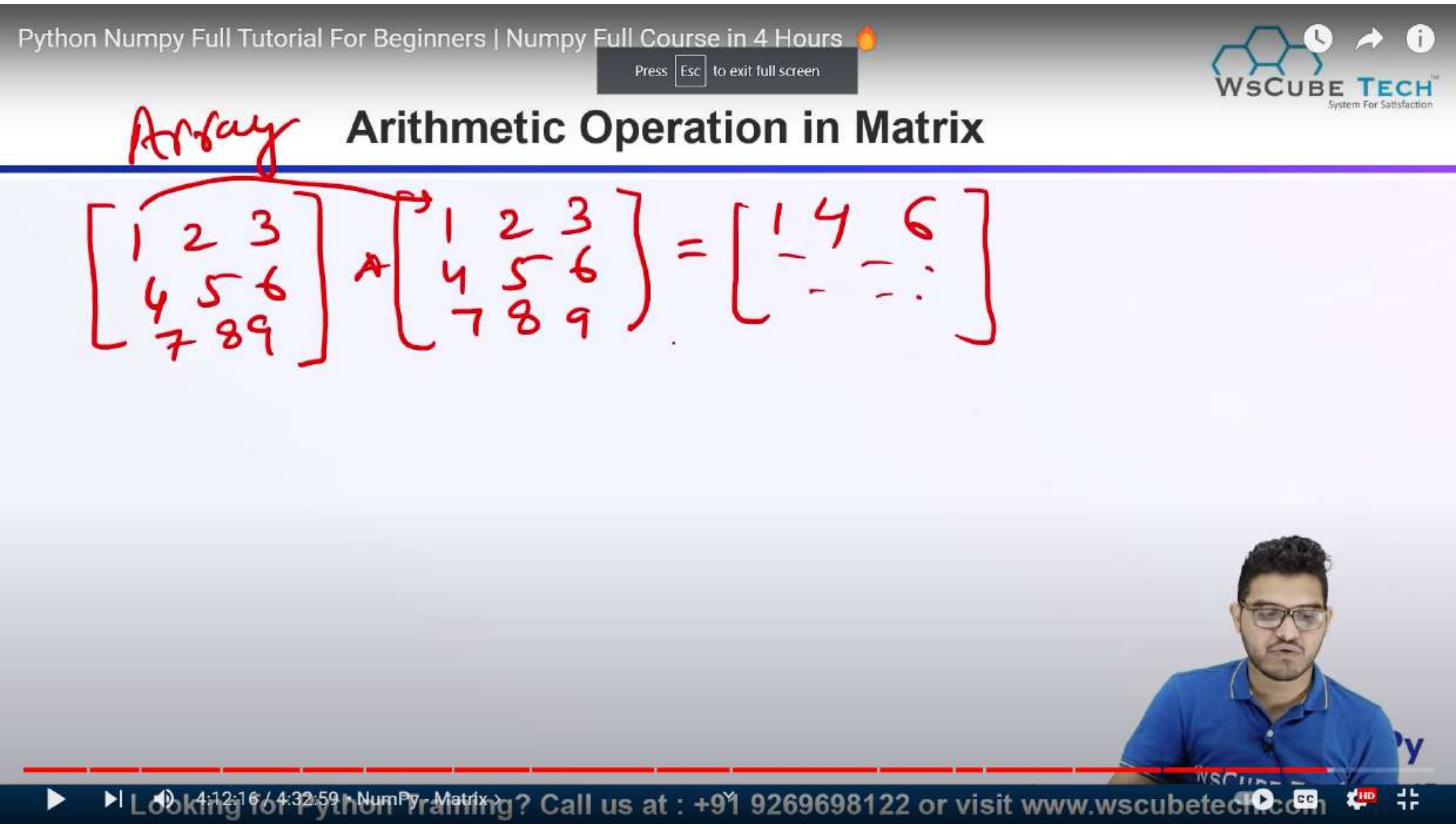
Matrix in NumPy Arrays

Matrix

$$\begin{bmatrix}1 & 2 & 3\\4 & 5 & 6\\7 & 8 & 9\end{bmatrix} \rightarrow$$

Array

```
[[1 2 3]
 [4 5 6]
 [7 8 9]]
```



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4:12:16 / 4:32:59 • NumPy - Matrix >
Py

Array

Arithmetic Operation in Matrix

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} * \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} = \begin{bmatrix} 1 & 4 & 6 \\ - & - & : \\ - & - & : \end{bmatrix}$$

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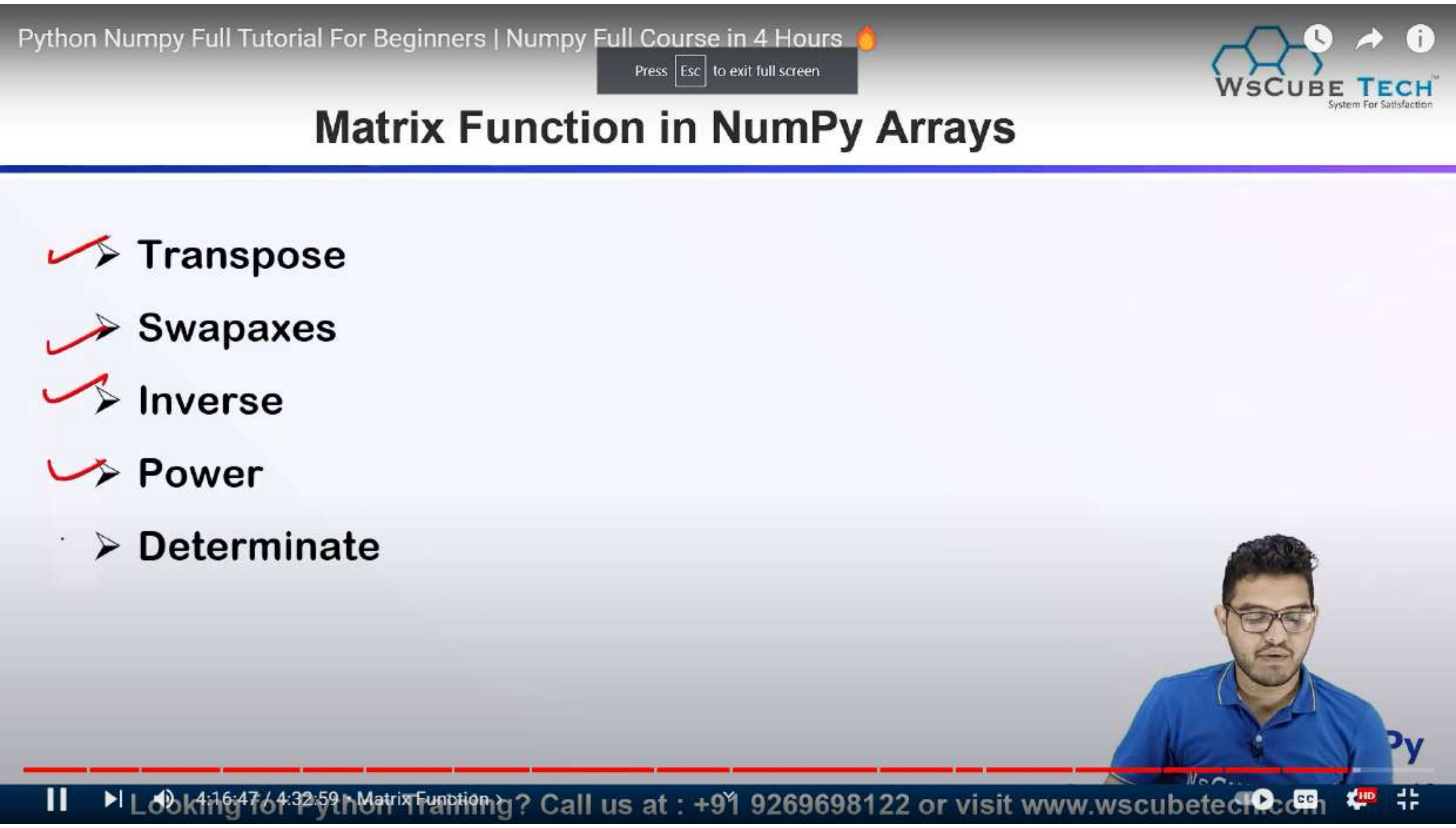

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4:16:47 / 4:32:59 • Matrix Function ›
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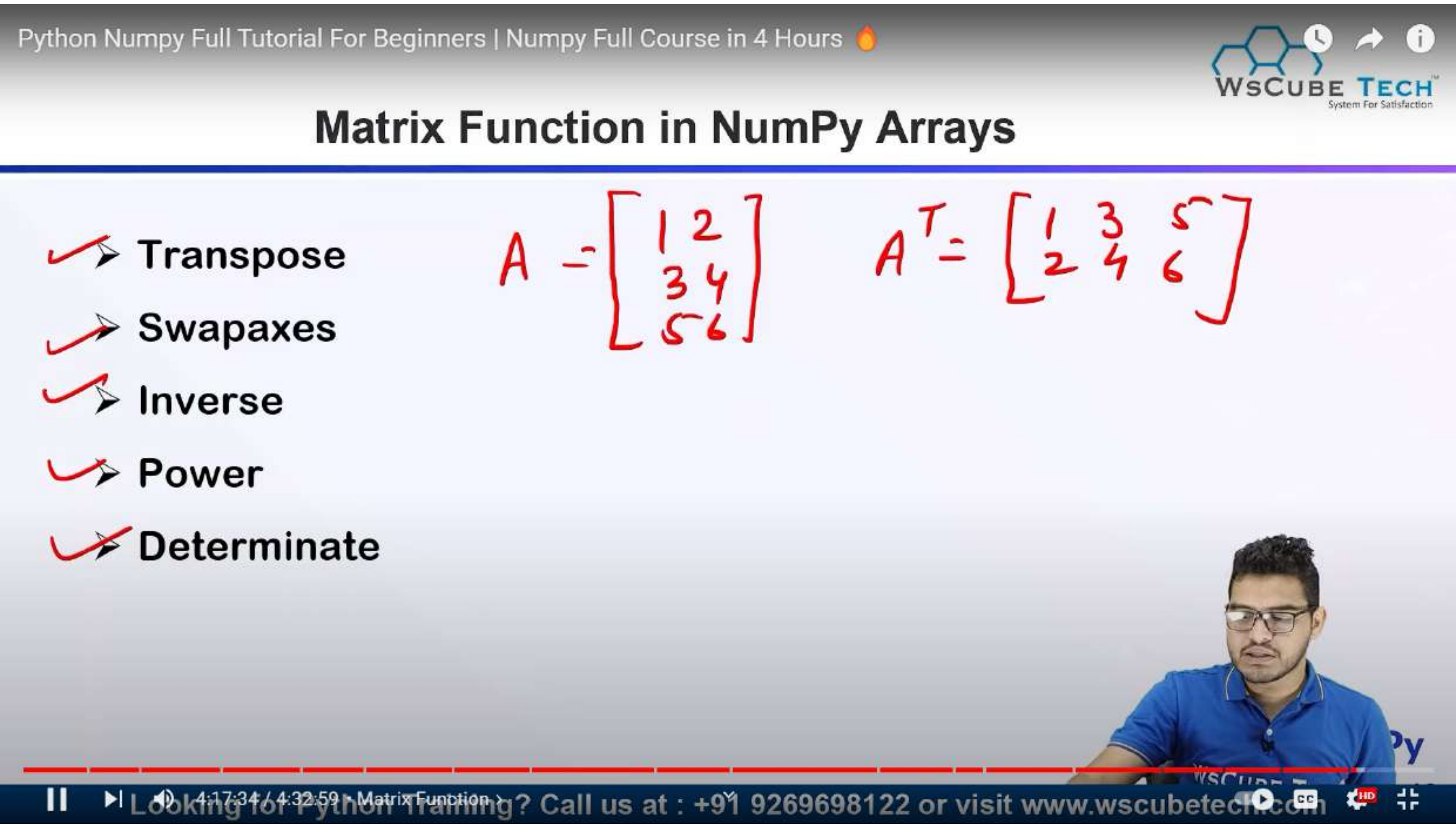
Matrix Function in NumPy Arrays

- ✓ ➢ Transpose
- ✓ ➢ Swapaxes
- ✓ ➢ Inverse
- ✓ ➢ Power
- ➢ Determinate



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Matrix Function in NumPy Arrays

- ✓ Transpose
- ✓ Swapaxes
- ✓ Inverse
- ✓ Power
- ✓ Determinate

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \qquad A^T = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$$

4:17:34 / 4:32:59 • Matrix Function >

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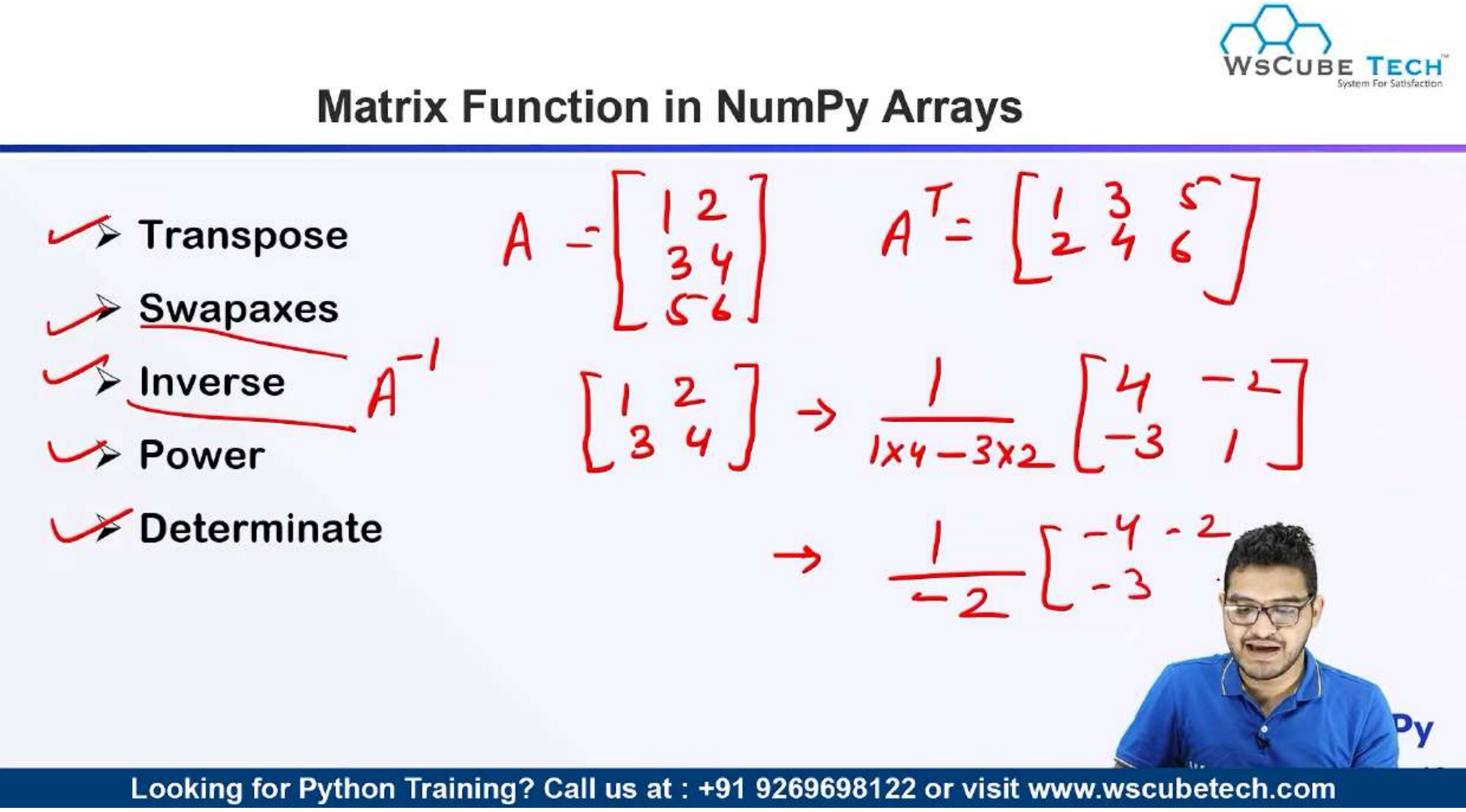

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Matrix Function in NumPy Arrays

- Transpose
- Swapaxes
- Inverse
- Power
- Determinate

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \qquad A^T = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$$

A^{-1}

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \rightarrow \frac{1}{1\times4-3\times2}\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$$

$$\rightarrow \frac{1}{-2}\begin{bmatrix} -4 & -2 \\ -3 & \end{bmatrix}$$

Py