

LEARN LTI

Best practices for Microsoft Learn LTI LMS integration with University of Oxford

<http://github.com/microsoft/learn-lti>



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What is LTI?

Learning Tools Interoperability, or LTI, is a standard published by the [IMS Global Learning Consortium](https://www.imsglobal.org/) that makes it possible to integrate platforms such as Learning Management Systems (LMS) like Blackboard or Canvas with third party tools and vendors.

This standard makes it possible for third party tools to integrate quickly and easily, without having to create different integration solutions for each LMS. LTI enables third party tools to integrate seamlessly into the LMS, without the student even realizing that they're using another tool.



Microsoft Learn LTI Application

What does the LTI do?

The Microsoft Learn LTI is an application that integrates MS Learn Modules and Learning Paths directly inside any LTI 1.1 or 1.3 compliant Learning Management System.

What is it?

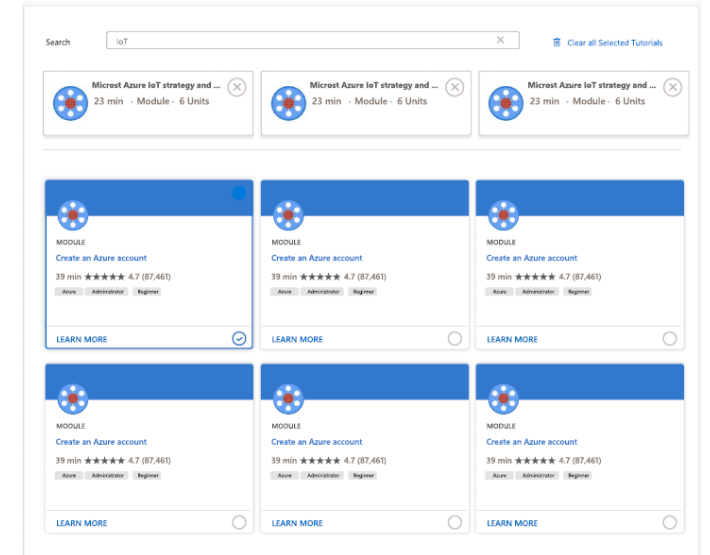
The LTI will be released as an open sourced LTI code sample showcasing how the MS Learn Catalog is used as a LTI application. The GitHub repo will contain all relevant deployment instructions.

Prerequisites

- LMS system that supports LTI 1.1 or 1.3
- Azure subscription
- IT administrator to create Azure resource
- Enabled Azure Active Directory

The screenshot displays the Microsoft Learn LTI Application configuration interface. At the top, a blue header bar contains the text "IoT no .1013476" and "Demo Activity 01" on the left, and "Terry Adams" and "CONTOSO UNIVERSITY" on the right. Below the header, a sidebar on the left is titled "Configuration" and includes a "View" section with icons for "General", "Tutorials", "Preview", "Participants", and "Dashboard". The main content area is titled "General" and features a "Not Published" status indicator and a "Publish" button. The "General" section contains a "Description" field with placeholder text "Insert here the description of the pathway for your students", a "Deadline" field set to "12/22/2018" with a calendar icon, and an "Add Link" section with three input fields: "Text to Display", "URL", and "Link Description". An "Add" button is located at the bottom of the "Add Link" section.

Installation process



Step 1 (IT) Deploy

Deploy to Azure from GitHub)

Step 2 (LMS Administrator) Install

Install LTI application in an LMS

Step 3 (Educator) Assign

Assigning courses within LMS

Step 1

IT Administrator (Azure Subscription Owner)

Adding an external tool


1

Clone the GitHub Repo

```
git clone https://github.com/microsoft/Learn-LTI.git
```

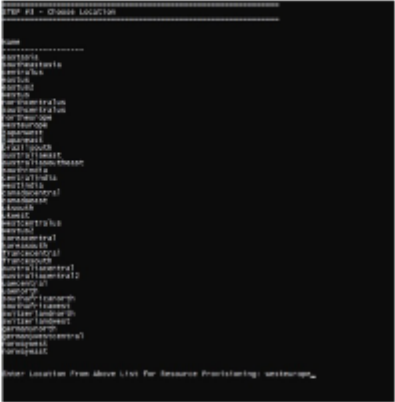
2

Install run.bat




3

Choose Location



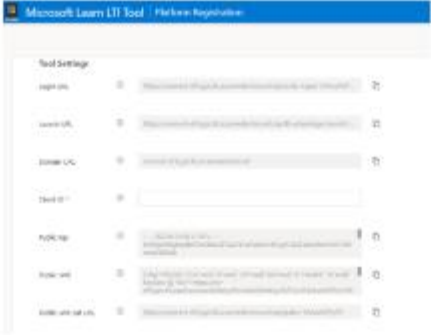
4

Install Deploy.ps1



5

Configure the Learn LTI Application Tool



Clone the GitHub Repo

```
git clone https://github.com/microsoft/Learn-LTI.git
```

Install run.bat

```
C:\windows\system32\cmd.exe

LEARN-LTI

Transcript started, output file is C:\Code\github\microsoft\Learn-LTI\deployment\Log\Transcript-25-07-2020-00-44-35.log

=====
STEP #1 - Logging into Azure
=====
```


Choose Location

```
Windows PowerShell
=====
STEP #3 - Choose Location
=====

Name
-----
eastasia
southeastasia
centralus
eastus
eastus2
westus
northcentralus
southcentralus
northeurope
westeurope
japanwest
japaneast
brazilsouth
australiaeast
australiasoutheast
southindia
centralindia
westindia
canadacentral
canadaeast
uksouth
ukwest
westcentralus
westus2
koreacentral
koreasouth
francecentral
francesouth
australiacentral
australiacentral2
uaacentral
uaenorth
southafricanorth
southafricawest
switzerlandnorth
switzerlandwest
germanynorth
germanywestcentral
norwaywest
norwayeast

Enter Location From Above List for Resource Provisioning: westeurope_
```


Install Deploy.ps1

```
=====
TOOL REGISTRATION URL (Please Copy, Required for Next Steps) -> https://learnclient3uyayok61.z6.web.core.windows.net/platform
=====
```







```
=====
***** Successfully Deployed Resources to Azure *****
=====
```

```
Transcript stopped, output file is C:\Users\vibhojwa\source\repos\Learn-LTI\deployment\Log\Transcript-28-07-2020-17-20-49.log
Press any Key to Exit:
```

Configure the Learn LTI Application Tool

 Microsoft Learn LTI Tool | Platform Registration

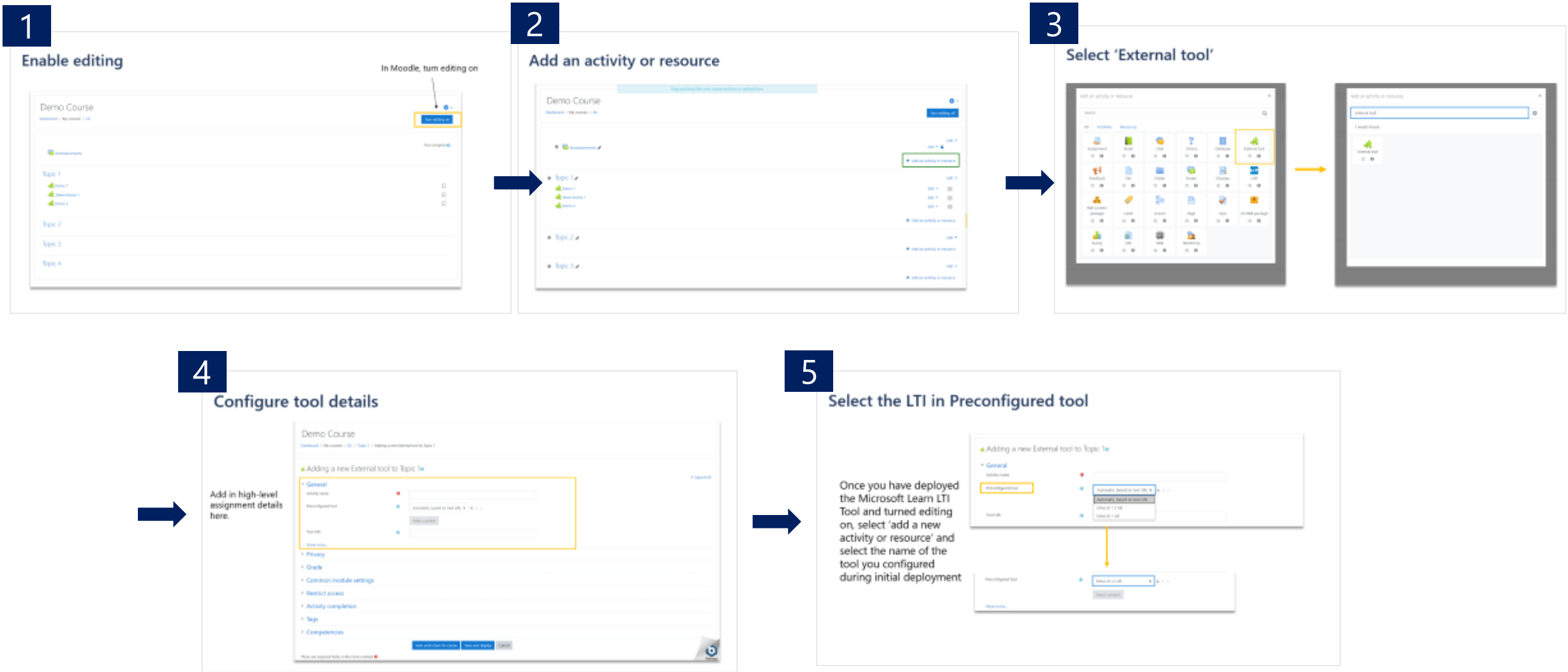
Tool Settings

Login URL	①	<code>https://connect-ef3sgzc3k.azurewebsites.net/api/oidc-login/-MVwa3KIP...</code>	
Launch URL	①	<code>https://connect-ef3sgzc3k.azurewebsites.net/api/lti-advantage-launch/-...</code>	
Domain URL	①	<code>connect-ef3sgzc3k.azurewebsites.net</code>	
Client ID *	①	<input type="text"/>	
Public Key	①	<code>-----BEGIN PUBLIC KEY----- MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEA0wI8wEM2G9O omAGi08xb</code>	
Public JWK	①	<code>{"Alg":"RS256","Crv":null,"D":null,"DP":null,"DQ":null,"E":"AQAB","K":null," KeyOps":["J"],"Kid":"https://kv- ef3sgzc3k.vault.azure.net/keys/EdnaLiteDevKey/6761cd14cfaa4039a7c96</code>	
Public JWK Set URL	①	<code>https://connect-ef3sgzc3k.azurewebsites.net/api/jwks/-MVwa3KPyF0</code>	

Step 2

LMS Administrator (Learning Management System Admin)

Adding an external tool



Enable editing

In Moodle, turn editing on

Demo Course

[Dashboard](#) / [My courses](#) / [DC](#)

Announcements

Topic 1

Demo 1

Demo Activity 1

Demo 2

☐

☐

☐

Topic 2

Topic 3

Topic 4

Your progress?

Add an activity or resource

Drag and drop files onto course sections to upload them

Demo Course

[Dashboard](#) / [My courses](#) / [DC](#)

Turn editing off

Announcements

Edit

Edit

Add an activity or resource

Topic 1

Demo 1

Demo Activity 1

Demo 2

Edit

✓

Edit

✓

Edit

✓

Add an activity or resource

Topic 2

Edit

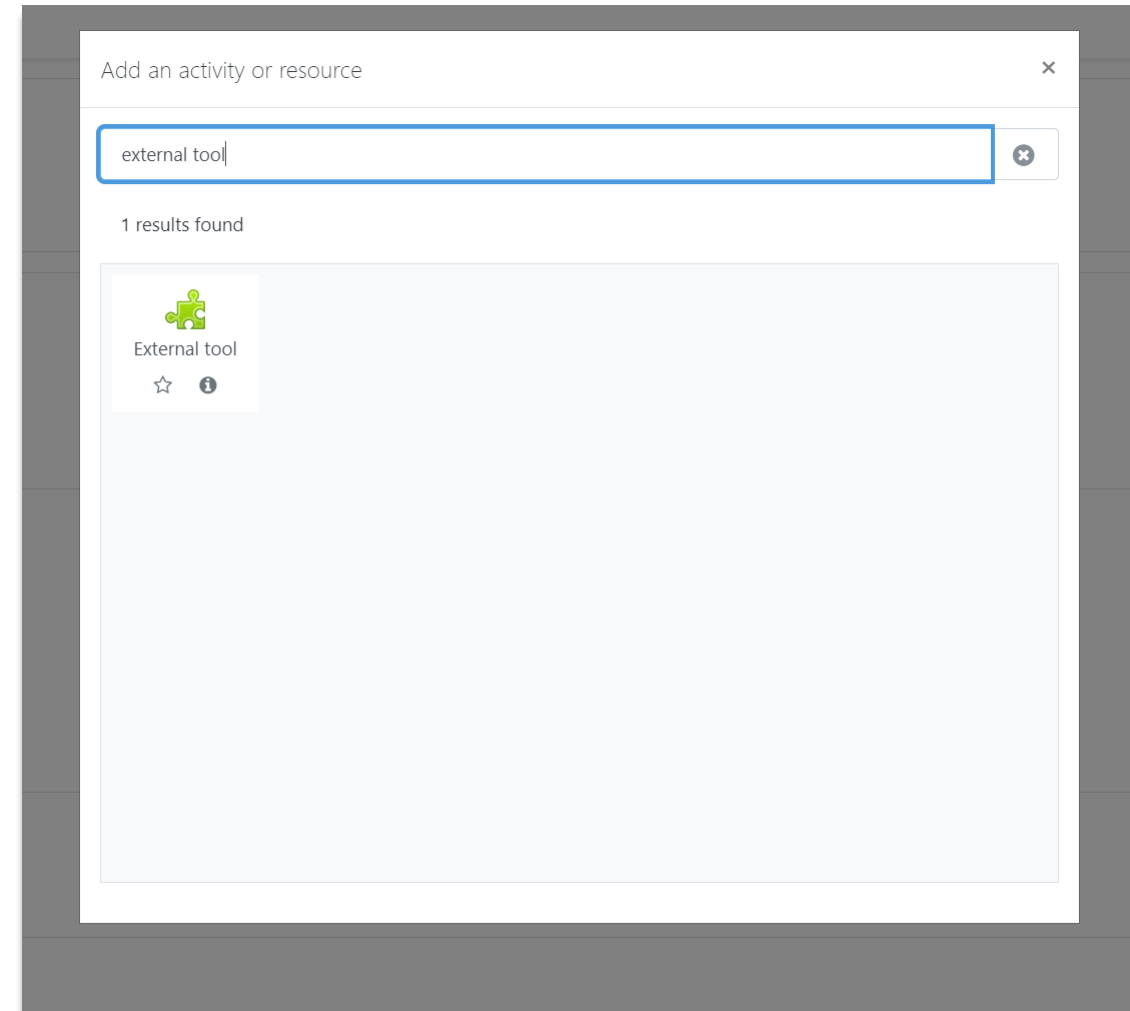
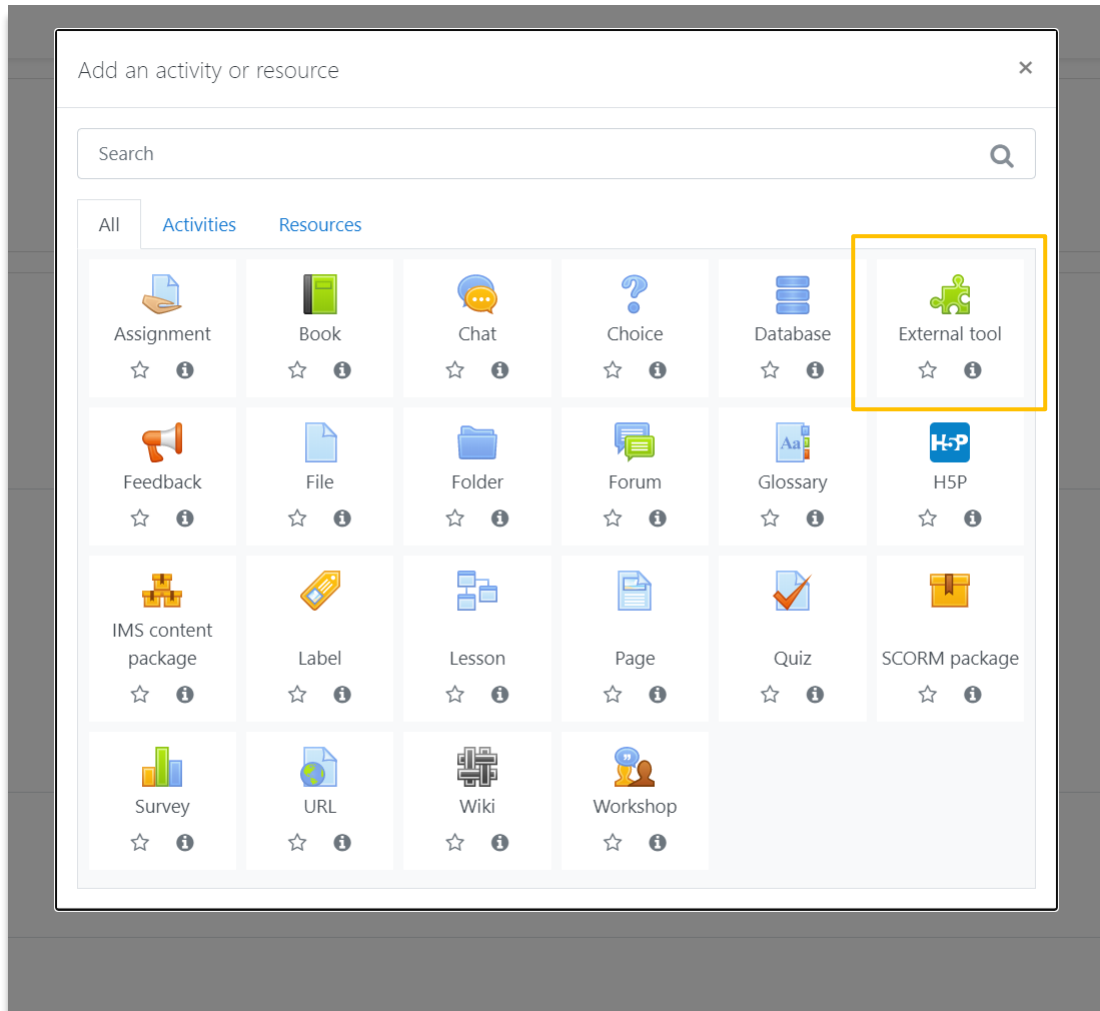
Add an activity or resource

Topic 3

Edit

Add an activity or resource

Select 'External tool'



Configure tool details

Add in high-level assignment details here.

Demo Course

[Dashboard](#) / [My courses](#) / [DC](#) / [Topic 1](#) / Adding a new External tool to Topic 1

✚ Adding a new External tool to Topic 1?

▾ General

Activity name

!

Preconfigured tool

?

Automatic, based on tool URL ▾ + ⚙ ×

Select content

Tool URL

?

[Show more...](#)

▸ Privacy

▸ Grade

▸ Common module settings

▸ Restrict access

▸ Activity completion

▸ Tags

▸ Competencies


Save and return to course

Save and display

Cancel

There are required fields in this form marked ! .

▸ Expand all

Manage

Select the LTI in Preconfigured tool

Once you have deployed the Microsoft Learn LTI Tool and turned editing on, select 'add a new activity or resource' and select the name of the tool you configured during initial deployment

The image shows a two-step process for adding an external tool. The top screenshot, titled 'Adding a new External tool to Topic 1', shows the 'General' tab with an 'Activity name' field and a 'Preconfigured tool' dropdown menu highlighted with a yellow box. The dropdown menu is open, showing options: 'Automatic, based on tool URL' (selected), 'Automatic, based on tool URL', 'Edna Lti 1.3 AB', and 'Edna Lti 1 AB'. A yellow arrow points from this menu to the bottom screenshot. The bottom screenshot shows the 'Preconfigured tool' dropdown now set to 'Edna Lti 1.3 AB', with a 'Select content' button below it. A 'Show more...' link is visible at the bottom left of the interface.

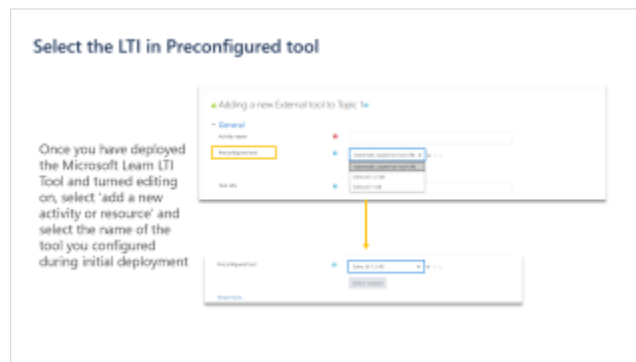
Step 3

Educator guidelines (demo slides using Moodle)

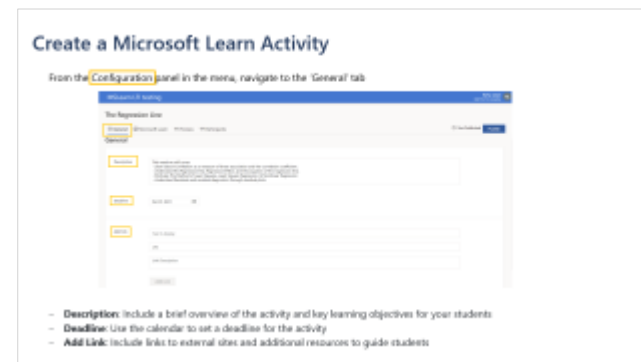
1



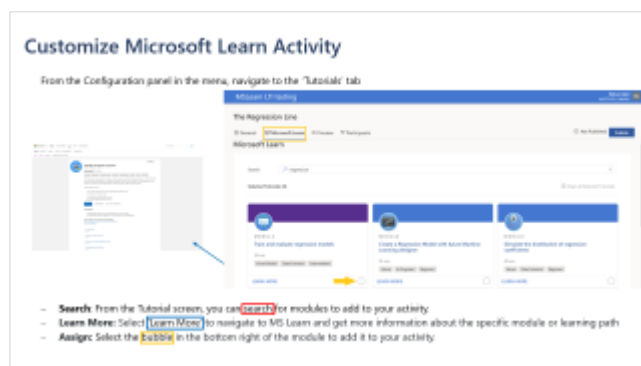
2



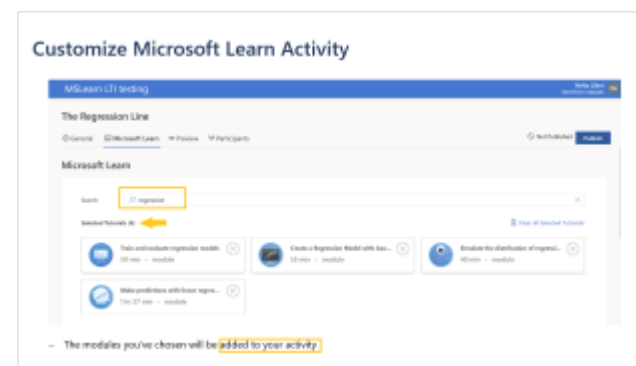
3



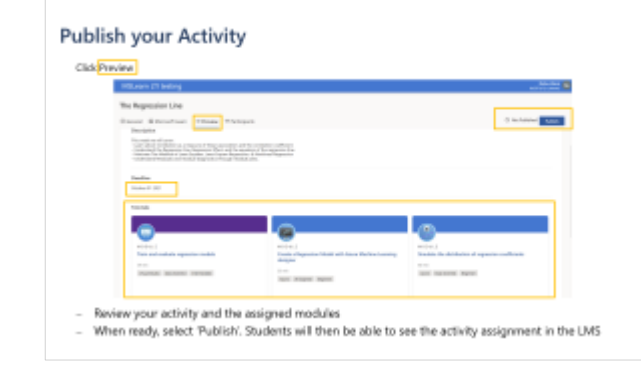
4



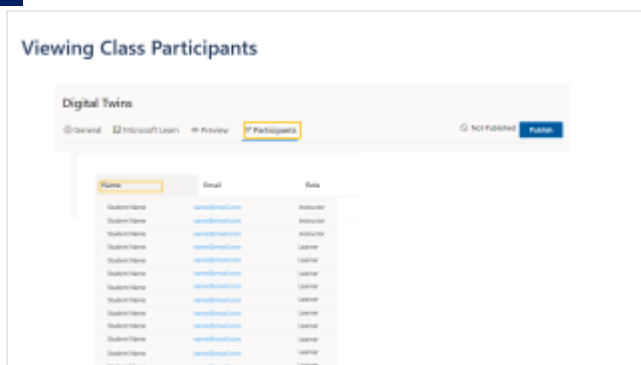
5



6



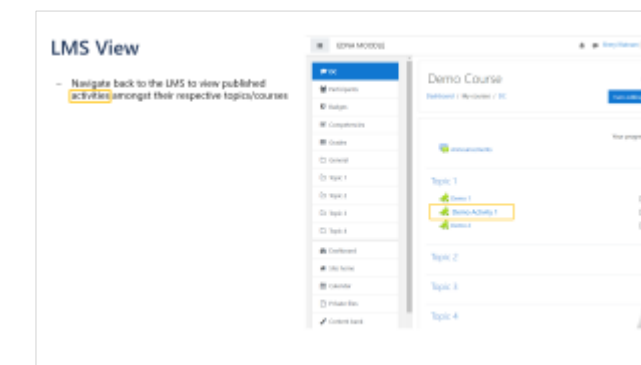
7



8



9



Select the LTI in Preconfigured tool

Once you have deployed the Microsoft Learn LTI Tool and turned editing on, select 'add a new activity or resource' and select the name of the tool you configured during initial deployment

Adding a new External tool to Topic 1

General

Activity name

Preconfigured tool

Tool URL

Automatic, based on tool URL

Automatic, based on tool URL

Edna Lti 1.3 AB

Edna Lti 1 AB

Preconfigured tool

Edna Lti 1.3 AB

Select content

Show more...

Create a Microsoft Learn Activity

From the **Configuration** panel in the menu, navigate to the 'General' tab

The screenshot displays the 'MSLearn LTI testing' interface. At the top, a blue header bar contains the text 'MSLearn LTI testing' on the left and 'Neha Lilani INSTITUTE CANVAS NL' on the right. Below the header, the main content area is titled 'The Regression Line'. A navigation bar below the title includes tabs: 'General' (highlighted with a yellow box), 'Microsoft Learn', 'Preview', and 'Participants'. To the right of these tabs are the status 'Not Published' and a 'Publish' button. The 'General' tab is active, showing a 'Description' field (highlighted with a yellow box) containing a list of topics: 'This week we will cover: - Learn about Correlation as a measure of linear association and the correlation coefficient. - Understand the Regression line, Regression Effect, and the equation of the regression line. - Motivate The Method of Least Squares, Least Square Regression, & Nonlinear Regression - Understand Residuals and residual diagnostics through residual plots.' Below the description is a 'Deadline' field (highlighted with a yellow box) set to 'Oct 01 2021' with a calendar icon. At the bottom is an 'Add link' section (highlighted with a yellow box) with three input fields: 'Text to display', 'URL', and 'Link Description', followed by an 'Add Link' button.

- **Description:** Include a brief overview of the activity and key learning objectives for your students
- **Deadline:** Use the calendar to set a deadline for the activity
- **Add Link:** Include links to external sites and additional resources to guide students

Customize Microsoft Learn Activity

From the Configuration panel in the menu, navigate to the 'Tutorials' tab

The screenshot displays the MS Learn LTI testing interface. The top navigation bar shows 'MS Learn LTI testing' and 'Neha Lilani INSTITUTE CANVAS'. The main content area is titled 'The Regression Line' and includes tabs for 'General', 'Microsoft Learn', 'Preview', and 'Participants'. The 'Microsoft Learn' tab is active. Below the tabs, there is a search bar with the text 'regression'. A section titled 'Selected Tutorials (0)' shows three modules:

- Module 1:** Train and evaluate regression models (59 min, Visual Studio, Data Scientist, Intermediate). A yellow arrow points to the 'LEARN MORE' button.
- Module 2:** Create a Regression Model with Azure Machine Learning designer (55 min, Azure, AI Engineer, Beginner).
- Module 3:** Simulate the distribution of regression coefficients (40 min, Azure, Data Scientist, Beginner).

Each module has a 'LEARN MORE' button and an 'Assign' bubble (a small circle) in the bottom right corner. A blue arrow points to the 'Create an Azure account' module in the left sidebar. A red box highlights the search bar, a blue box highlights the 'Learn More' button, and a yellow box highlights the 'Assign' bubble.

- **Search:** From the Tutorial screen, you can search for modules to add to your activity.
- **Learn More:** Select 'Learn More' to navigate to MS Learn and get more information about the specific module or learning path
- **Assign:** Select the bubble in the bottom right of the module to add it to your activity.

Customize Microsoft Learn Activity

MSLearn LTI testing

Neha Lilani
INSTITUTE CANVAS

The Regression Line

General

Microsoft Learn

Preview


Participants


Not Published **Publish**

Microsoft Learn


Search

regression


Selected Tutorials (4) 




Train and evaluate regression models
59 min • module



Create a Regression Model with Azu...
55 min • module



Simulate the distribution of regressi...
40 min • module

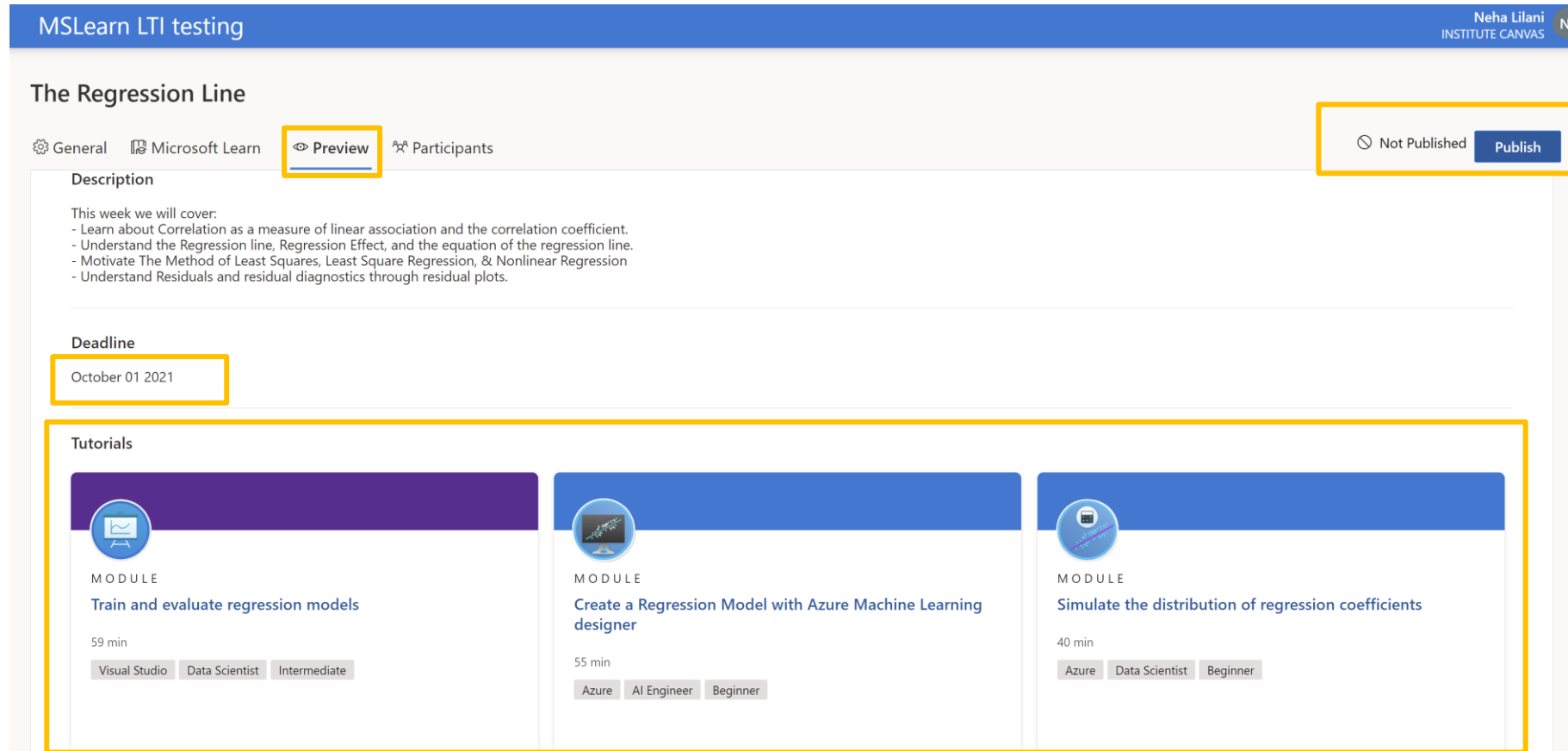


Make predictions with linear regres...
1 hr 27 min • module

- The modules you've chosen will be added to your activity

Publish your Activity

Click **Preview**



MSLearn LTI testing

Neha Lilani
INSTITUTE CANVAS

The Regression Line

General Microsoft Learn **Preview** Participants

Not Published Publish

Description




This week we will cover:

- Learn about Correlation as a measure of linear association and the correlation coefficient.
- Understand the Regression line, Regression Effect, and the equation of the regression line.
- Motivate The Method of Least Squares, Least Square Regression, & Nonlinear Regression
- Understand Residuals and residual diagnostics through residual plots.

Deadline

October 01 2021

Tutorials

MODULE
 Train and evaluate regression models 59 min Visual Studio Data Scientist Intermediate
 Create a Regression Model with Azure Machine Learning designer 55 min Azure AI Engineer Beginner
 Simulate the distribution of regression coefficients 40 min Azure Data Scientist Beginner

- Review your activity and the assigned modules
- When ready, select 'Publish'. Students will then be able to see the activity assignment in the LMS

Student View of Activity

IoT no .1013476

Demo Activity 01

Terry Adams
CONTOSO UNIVERSITY

Assignment 01

Description

Send messages directly from the device to the IoT Hub on Azure
Check that the IoT Hub recieve those messages.

After you are done submit your work either via Git repository or via Manual Upload .file

Deadline


January 5 2020 12:00 PM

Links

[Share Data](#)

here are many variations of passages of Lorem Ipsum available, but the majority have suffered alteration insome form, by injected humour, or randomised words which

Tutorials




MODULE

Create an Azure account

39 min ★★★★★ 4.7 (87,461)

Azure Administrator Beginner

LEARN MORE




MODULE

Create an Azure account

39 min ★★★★★ 4.7 (87,461)

Azure Administrator Beginner

LEARN MORE



MODULE

Create an Azure account

39 min ★★★★★ 4.7 (87,461)

Azure Administrator Beginner

LEARN MORE

LMS View

- Navigate back to the LMS to view published **activities** amongst their respective topics/courses

The screenshot displays the EDNA MOODLE LMS interface. At the top, the header shows 'EDNA MOODLE' and a user profile for 'Sheryl Ratnam'. The left sidebar contains a menu with options: DC, Participants, Badges, Competencies, Grades, General, Topic 1, Topic 2, Topic 3, Topic 4, Dashboard, Site home, Calendar, Private files, and Content bank. The main content area is titled 'Demo Course' and includes a 'Turn editing on' button. Below the course title, there is a section for 'Announcements' and a 'Your progress' link. The course content is organized into topics: Topic 1, Topic 2, Topic 3, and Topic 4. Under Topic 1, there are three activities: 'Demo 1', 'Demo Activity 1' (highlighted with a yellow box), and 'Demo 2'. Each activity has a corresponding checkbox on the right.

EDNA MOODLE

Sheryl Ratnam

DC

Participants

Badges

Competencies

Grades

General

Topic 1

Topic 2

Topic 3

Topic 4

Dashboard

Site home

Calendar

Private files

Content bank

Demo Course

Dashboard / My courses / DC

Turn editing on

Your progress ?

Announcements

Topic 1

Demo 1

Demo Activity 1

Demo 2

Topic 2

Topic 3

Topic 4

Step 4

Organizational Reporting

Microsoft Learn Reporting

Organizational Reporting

This is a service available to organizations to view Microsoft Learn training progress and achievements of the individuals within their tenant. This service is available to both enterprise customers and educational organizations.

Azure Data Share

The system uses a service called Azure Data Share to extract, transform, and load (ETL) user progress data into data sets, which can then be processed further or displayed in visualization tools such as Power BI. Data sets can be stored to either Azure Data Lake, Azure Blob storage, Azure SQL database, or Azure Synapse SQL Pool.

Reports and Dashboards

Organizations can create and manage their data share using Azure Data Share's and PowerBI reporting.

<https://docs.microsoft.com/en-us/learn/support/org-reporting>



Step 5

Best Practice Implementation Plan

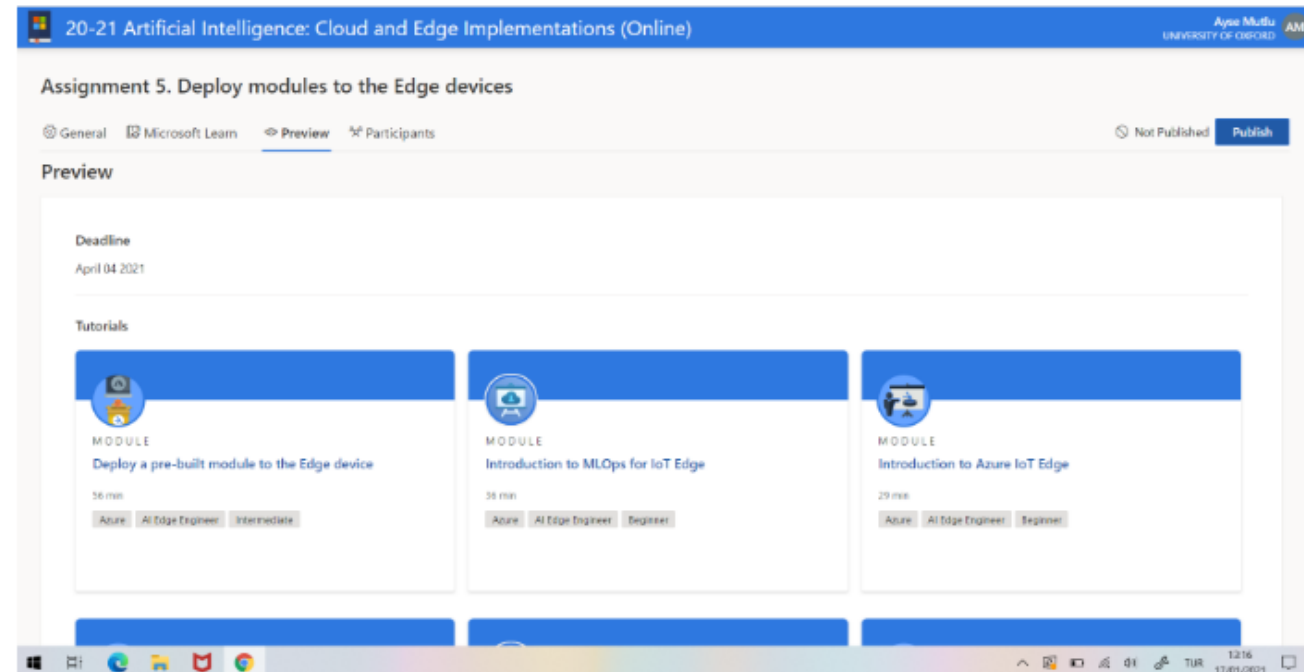
How Institutions are using the tool



UNIVERSITY OF
OXFORD

Institutions using Microsoft Learn LTI + MS Learn Modules within their course.

Learn from the University of Oxford This session looks at how the University of Oxford Artificial Intelligence: Cloud and Edge Implementation course is utilizing the Microsoft Learn LTI Application and Microsoft Learn Modules and Units within their curriculum to support students in developing digital skills to succeed in the workplace.





Course Overview

Artificial Intelligence: Cloud and Edge Implementations is a pioneering online course covering AI, MLOps (Machine Learning and DevOps), cloud computing, and edge computing.

For 2021 was made available for 100% online.

Designed for industry practitioners with some background in coding, the course is ideal if you have development, design, or software architecture experience and want to transition your career toward AI.

This course is designed to create a new breed of engineer through a solid grounding in artificial intelligence (AI), edge computing (Internet of Things), MLOps, and Cloud technologies to develop production systems within a full-stack environment.

Microsoft Learning Path AI Edge Engineer

<https://docs.microsoft.com/en-us/learn/paths/ai-edge-engineer/>

Learn more about the course at <https://aka.ms/SharpenAIEdge>



AI edge engineer

4 hr 28 min remaining • Learning Path • 6 of 14 modules completed

Beginner AI Engineer Data Scientist Azure IoT Azure Notebooks Cloud Shell Container Instances
Container Registry IoT Edge IoT Hub Machine Learning Azure Resource Manager Virtual Machines

The interplay between AI, cloud, and edge is a rapidly evolving domain. Currently, many IoT solutions are based on basic telemetry. The telemetry function captures data from edge devices and stores it in a data store. Our approach extends beyond basic telemetry. We aim to model problems in the real world through machine learning and deep learning algorithms and implement the model through AI and Cloud on to edge devices. The model is trained in the cloud and deployed on the edge device. The deployment to the edge provides a feedback loop to improve the business process (digital transformation).

In this learning path, we take an interdisciplinary engineering approach. We aspire to create a standard template for many complex areas for deployment of AI on edge devices such as Drones, Autonomous vehicles etc. The learning path presents implementation strategies for an evolving landscape of complex AI applications. Containers are central to this approach. When deployed to edge devices, containers can encapsulate deployment environments for a range of diverse hardware. CI/CD (Continuous integration - continuous deployment) is a logical extension to deploying containers on edge devices. In future modules in this learning path, we may include other techniques such as serverless computing and deployment on Microcontroller Units.

The engineering-led approach underpins themes / pedagogies for engineering education such as

- Systems thinking
- Experimentation and Problem solving
- Improving through experimentation
- Deployment and analysis through testing
- Impact on other engineering domains
- Forecasting behaviour of a component or system
- Design considerations
- Working within constraints/tolerances and specific operating conditions – for example, device constraints
- Safety and security considerations
- Building tools which help to create the solution
- Improving processes - Using edge(IoT) to provide an analytics feedback loop to the business process to drive processes
- The societal impact of engineering
- The aesthetic impact of design and engineering
- Deployments at scale
- Solving complex business problems by an end-to-end deployment of AI, edge, and cloud.

Ultimately, AI, cloud, and edge technologies deployed as containers in CI/CD mode can transform whole industries by creating an industry-specific, self-learning ecosystem spanning the entire value chain. We aspire to design such a set of templates/methodologies for the deployment of AI to edge devices in the context of the cloud. In this learning path, you will:

- Learn about creating solutions using IoT and the cloud
- Understand the process of deploying IoT based solutions on edge devices
- Learn the process of implementing models to edge devices using containers
- Explore the use of DevOps for edge devices

Produced in partnership with the University of Oxford – Ajit Jaokar *Artificial Intelligence: Cloud and Edge Implementations* course

Prerequisites

None

[Continue >](#) [Bookmark](#) [Add to collection](#)

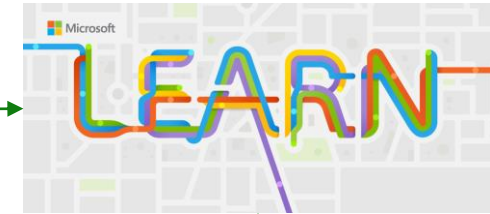
Microsoft Learn LTI Application + Azure Education Hub

Students log into Canvas and see all the resources for the course
Microsoft Learn Modules embedded within the course + Azure
Education Subscriptions for hands on labs via the Microsoft Learn LTI

School to provide canvas
team list of email address for
students



Microsoft Learn LTI Application



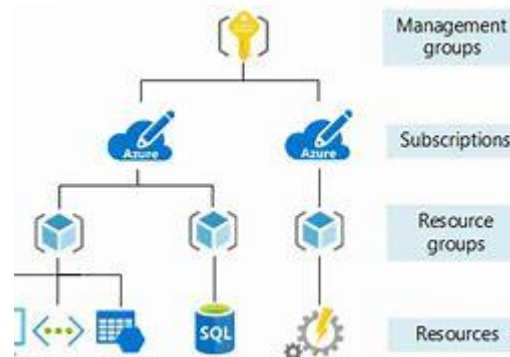
Students Provisioned to a
Microsoft team for the
course by Dept



Students provided access to
Oxford Active Directory for
authentication



Student Azure Subscription
provisioned by for hands on labs
+ learning via Azure



Student
undertake
Microsoft learn
Modules from
Azure
Subscriptions

Students undertake CI/CD for projects and
develop personal portfolios
Github classroom Auto grading can be implemented to autograde
project submissions



UNIVERSITY OF
OXFORD



Questions

<http://github.com/microsoft/learn-Iti>
