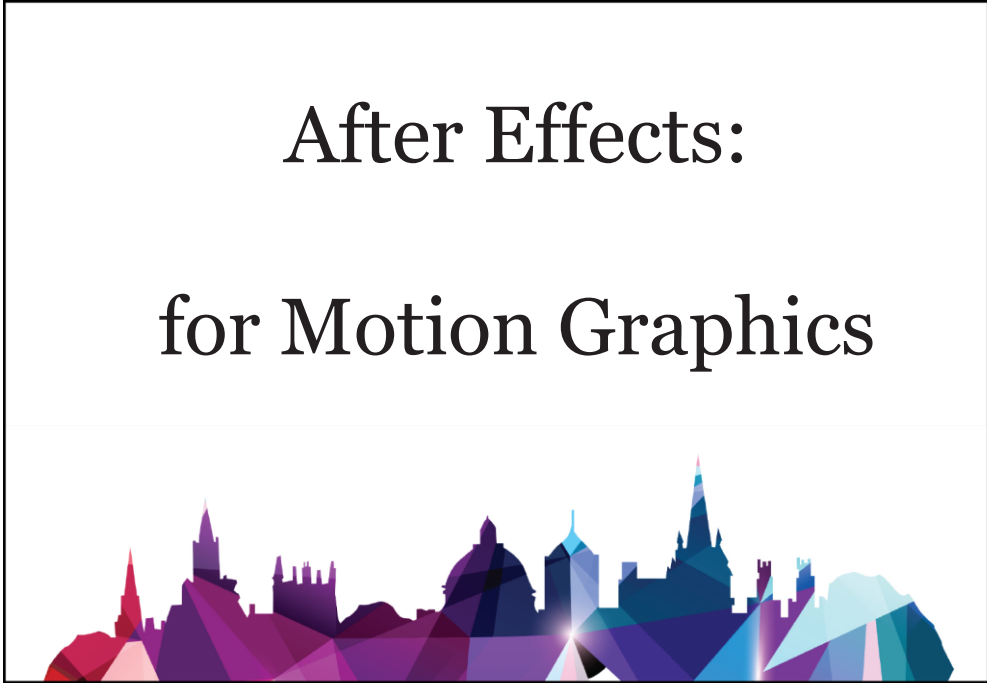# After Effects:

for Motion Graphics

The small print

Prerequisites

Time in the workshop is precious – it is an opportunity for you to interact with the workshop leader and other participants through questions and discussions and to share your experiences and concerns. To make the most of this time we sometimes ask you to carry out learning activities ahead of the workshop so that everyone comes into the class with the same basic knowledge. We keep this prior learning to a minimum and often make use of online videos. Online videos provided through 'Molly' can be accessed by University members anytime, anywhere, through a browser or app.

Your course booking will tell you if any prior learning activity is required. If you don't have an environment where you can do this learning, you can come along to one of our 'qu**iet**' sessions. These are scheduled every week in normal term-time, and are a quiet space where you can work through 'Molly' videos or other workshop resources. If you turn up for a workshop without having done the prior learning, the workshop leader may suggest that you come back on another session.

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About the workshop designer

Carl Wenczek is a very experienced architectural illustrator and an expert in 3d modelling and 2d imaging. He is a Director of his own small company and over the last 18 years has built long lasting relationships with his clients, creating 100's of illustrations and helping them convey their ideas and designs.

Running parallel to his commercial work, Carl is also a part-time lecturer in multimedia and has been teaching at Oxford University's IT Services for the last 17 years, delivering courses in Photoshop, Illustrator, InDesign, After Effects, Blender, GIMP, Inkscape and digital photography.

Carl also coaches Paddlesport (kayaking, canoeing and stand up paddling) and Indoor Climbing. These sports are often coached in demanding and dynamic environments and require strong leadership skills and a calm persona!

Revision history

Version	Date	Author	Comments
1.0	April 2019	Carl Wenczek	First version, full day course
2.0	January 2020	Carl Wenczek	Converted to a 3 hour course
2.1	May 2020	Carl Wenczek	Updated further information text

About this workshop

Adobe After Effects is the leading professional software for motion graphics, video compositing and visual effects.

What you will learn
In this workshop you will learn to create 2d animations using vector graphics.

What you need to know
You do not need any prior knowledge of *Adobe After Effects*. Experience using Photoshop (GIMP) or Illustrator (Inkscape) will be to your advantage, but not necessary.

This workshop will cover:

• A workflow
• Introduction to *Adobe After Effects*
• Setting up a new project
• Working with the timeline
• Importing vector artwork
• Basic animation
• Exporting the animation

If you need to review these activities, Molly is a great place to get guidance. There is an activity with relevant Molly videos in the IT Learning Portfolio: visit *skills.it.ox. ac.uk/it-learning-portfolio* and search for "Adobe After Effects".

The resources you need
Sample documents that you can use to experiment with will be made available, but you may like to bring along your own.

Unless you have been told otherwise, in classroom workshops there will be a computer available for you to use with *Adobe After Effects* installed.

You can use your own computer with your preferred app installed if you want to – just bear in mind that I am not an expert in every app (although I am sure that between us we will be able to sort out most problems!).

Contents

Learning Objective 01 - Introduction and the Interface

What Can After Effects Do? After Effects (AE) is not an editing program; if you want to edit a video, Final Cut Pro and Premiere do a much better job than AE. In the industry, AE is commonly used for producing animated infographics, title sequences and integrating graphics with film footage.

1 = **File menu**

2 = **Tool bar** (*at the top of the interface you will find the tool bar which allows you to activate different tools*)

3 = **Project and Effect Controls Windows** (*lists your footage and stock resources*)

4 = **Composition Window** (*the preview window and the main animation space that you work in when building an AE project*)

5 = **Panels**

6 = **The Timeline and Render Queue** (*this is where most of your animation work will be done*)
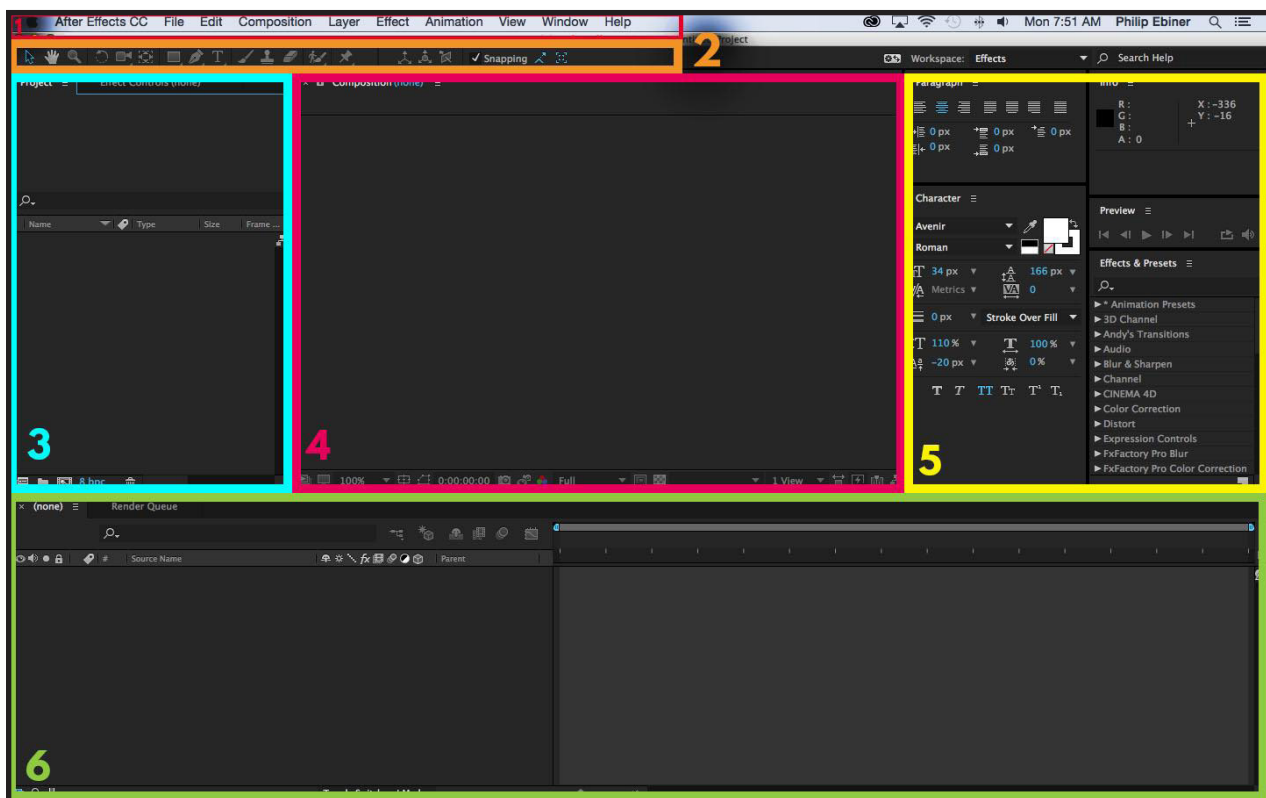
Learning Objective 02 - Setting up a new Project and Composition

Project: An After Effects project is a single file that stores compositions.

Composition: A composition is the framework for a movie. Each composition has its own timeline. A typical composition includes multiple layers that represent components such as video and audio footage items, animated text and vector graphics, still images, and lights. Simple projects may include only one composition; complex projects may include hundreds of compositions to organize large amounts of footage or many effects.

Task

• Create a new **Project** and then create a new **Composition** (**Composition>New Composition...**)

Preset = HDV/HDTV 720 29.97
Duration= 0; 00; 05; 00 (5 seconds)

More information can be found at the back of these notes.

• Composition settings can be changed by going to **Composition>Composition Settings...**

• Save your project by chosing **File>Save As**.

Learning Objective 03 - Time and the Timeline

Take a look at the **Timeline**. You will notice that the duration of your animation is indicated horizontally, along the top of the Timeline, in what is called the Time Ruler.

The Time Ruler displays the duration as a combination of frames and seconds (*by default, After Effects displays time in Society of Motion Picture and Television Engineers (SMPTE) timecode: hours, minutes, seconds, and frames*).

The duration of your current composition can be lengthened or shortened by going to **Composition>Composition Settings...**

Learning Objective 04 - Importing artwork from Adobe Illustrator

After Effects (AE) has a fairly limited set of vector drawing and editing tools. Therefore, it is best to create more complex artwork in an application like Adobe Illustrator and then import the artwork into AE.

Task

Import an Illustrator file.

• File>Import>File...

Once imported, your Illustrator file will appear in the **Project** window as one of the resources available for you to use in your composition.

To use the file, drag it down into the **Timeline**.

Considerations:

• Centre the Anchor Point (**Layer>Transform>Centre Anchor Point in Layer Content**).

• If you are going to scale your Illustrator file ensure you enable **Continuously Rasterize**.
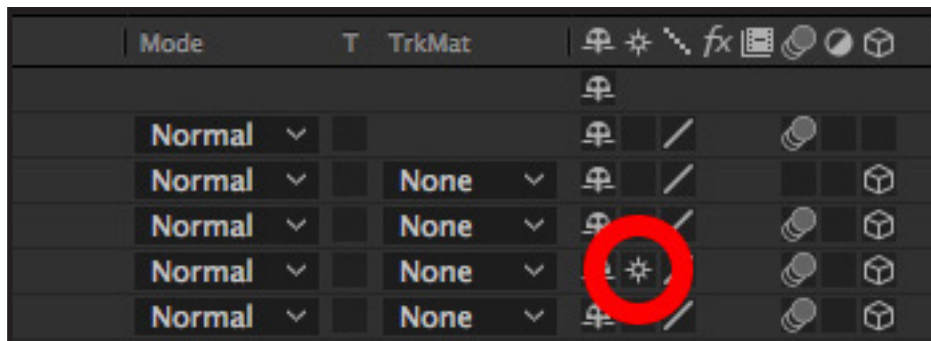
Learning Objective 05 - Creating Shapes and Shape Layers

After Effects includes five shape tools: Rectangle, Rounded Rectangle, Ellipse, Polygon, and Star.

When you draw a shape directly in the Composition panel, After Effects adds a new shape layer to the composition.

You can apply stroke and fill settings to a shape, modify its path, and apply animation presets. Shape attributes are all represented in the Timeline panel, and you can animate each setting over time.

Task:

• What happens if you create two shapes, one after the other?
...

• What happens if you deselect the first shape before creating a second shape?
...

• Try changing the Fill and Stroke attributes of your shapes.

Remember to **name your Shape Layers!**

Learning Objective 06 - Moving Shapes in a straight line

Before we animate a shape moving in a straight line let's examine the **Shape Layer** and the various transformation options.

Task

• Create two shapes in the same Shape Layer.

• Examine the difference between Shape Layer transformations and Content transformations.
...

Keyframes

A key frame or keyframe is a location on a timeline which marks the beginning or end of a transition. It holds special information that defines where a transition should start or stop. The intermediate frames are interpolated over time between those definitions to create the illusion of motion.

Task

• Animate the shapes moving in a straight line using the **Position** property **stop watch**.

• Try Content transformation and the Shape Layer transformation.

Task

• Right-click on a keyframe for either **Keyframe Assistant** or **Keyframe Interpolation...**

• Change keyframes from Linear to Ease In/Ease Out.

Learning Objective 07 - Add Fade

You can animate different properties of the same shape to give a combined effect.

Task

• Continue working with the shapes you created in the previous task.

• Add fade to your moving shapes by animating the **Opacity** property.

Learning Objective 08 - Create a new Composition

Think of your animation as a film. Films are usually composed of a series of scenes.

In After Effects we can think of Compositions as being like scenes.

It is easier to break your animation down into a series of Compositions (scenes) and then combine these together later.

Task

• Create a new Composition (**Composition>New Composition...**)

• The settings for this new Composition should be the same as for the previous one you created.

• Your Compositions will appear in the top-left corner of the Timeline and Render Queue panel.

Considerations:

• It is probably a good idea to rename your Compositions. How do you think you can do this?
...

Learning Objective 09 - Move a Shape while changing colour

Task

• Using your new Composition, create a new shape.

• Move the shape in a straight line and add a colour change by animating the **Fill Colour** property.

Learning Objective 10 - Scaling

Animating a shape changing **Scale** is a very important and fundamental technique to master. Using scale you can make shapes appear to squash and squeeze when they bounce, grow or seem to move closer or receed into the distance.

Task

• Begin by animating a shape scaling up or down.

• Introduce movement by animating the Position property.

• Try a non-uniform scale.
...

Considerations:

• What happens if you change scale after altering the position of the anchor point?
...

• Use the **Pan Behind (Anchor Point) Tool** and/or
Layer>Transform>Centre Anchor Point in Layer Content.

Learning Objective 11 - Rotating

Rotation is the final transformation property we will examine. As with the other properties we have animated so far, rotation can be combined with other tranformations.

Task

• Begin by animating a shape rotating.

• Then introduce movement while the shape is rotating.

There are two methods of rotating a shape associated with the Rotation property. Can you work out what they are and how they work?
...

• Finally, rotate a shape while changing the position of it's **Anchor Point**.

Learning Objective 12 - Copying Keyframes

Building on the last task, copy keyframes to animate the shape spiralling back to it's starting position.

Task

Select keyframe(s) and copy (**Ctrl + C**) , advance time and paste keyframe(s) (**Ctrl + V**)

Have a go at moving keyframes as well.
...

Learning Objective 13 - Stacking up Compositions

In *Learning Objective 08* we discussed how we can think of Compositions as being like scenes and how we can combine these Compositions (scenes) to make our completed film.

It is now time to put this into practice.

You will have a Project that consists of a number of Compositions.

Task

• Check through your Compositions and rename them if necessary.

• Create a **New Composition** that will be your finished film. Call this Composition "*Film*". You may need to make the duration of this new Composition longer.

• Add some of your existing Compositions by clicking-and-dragging them from the **Project** window into the **Timeline** window.

• Experiment with dragging the individual Compositions along the timeline to stagger their start times.
...

Learning Objective 14 - Stretching time

The duration of you Compositions can be increased or decreased by scaling the length of the time bar or the distance between keyframes.

In this task we will scale down the length of the time bars for the Compositions to decrease their durations.

Task

• Select a Composition's time bar in the Timeline window.

 • Hold down **Alt** while dragging the end of the time bar left or right to either increase or decrease the duration of the Composition.

Task

Before we finish this learning objective try the following to see what happens:

• Change the parameters of one of the Compositions you used in your final "*Film*" Composition.

• Go to your "*Film*" Composition and see if the change has been carried over.
...

Learning Objective 15 - Creating Text

Animating text layers is useful for many purposes, including animated titles, credit rolls, and dynamic typography.

As with other layers in After Effects, you can animate entire text layers. However, text layers offer additional animation features with which you can animate the text within the layers. You can animate text layers by using any of the following methods:

• Animate the Transform properties, as you would any other layer, to change the entire layer, not its text contents.

• Animate the source text of the layer, so that the characters themselves change to different characters or use different character or paragraph formats.

• Use text animators to animate many properties of individual characters or a range of characters (*Learning Objective 16*).

Task

• To place text, select the **Type tool** in the Tools panel, click in the Composition window, and type. Use the **Selection tool** to reposition the text.

• Choose fonts, size, colour, justification, and other text properties in the **Character** and **Paragraph** panels.

• Once you have created, formatted and positioned your text look at the Timeline. You will see a solid red bar. Try dragging the start and the end of this red bar to different positions along the Timeline and then preview the animation. What happens?
...

Learning Objective 16 - Text Animators

Text animators make it relatively easy to create sophisticated text animation in After Effects. We will be looking at two text animators, **Position** and **Opacity**.

Task

• Create a **New Composition...** and type some text e.g. "*typewriter text*"

• From the **Source Text** area locate the text animators and choose **Position**. Fully expand the **Range Selector** area so that you can see all the options.

• Set the starting position of your text using the **Position** property.

• Animate the **Start** property from **0%** at the beginning of the animation and finishing at **100%**.

• Try creating a mask.
...

Task

• Fade text in, letter by letter, using the **Opacity** animator.

• Tip: Remember to set the **Opacity** property to **zero**, then animate the **Range**. Leave the Opacity property once you have set the starting state.
...

Learning Objective 17 - Rendering and Output

The primary way of rendering and exporting movies from After Effects is through the Render Queue panel.

When you place a composition into the Render Queue panel, it becomes a render item. You can add many render items to the render queue, and After Effects can render multiple items in a batch, unattended. When you click the Render button in the upper-right corner of the Render Queue panel, all items with the status of Queued are rendered and output in the order in which they are listed in the Render Queue panel.

For more information visit *https://helpx.adobe.com/uk/after-effects/using/basics-rendering-exporting.html*

Task

• Add a Composition to the Render Queue (**Compostion>Add to Render Queue**).

• From the **Output Module** choose **Lossless AVI**.

• Choose a file name and location from **Output To**.

• Click the **Render** button to generate the finished movie.

Keyboard shortcuts and Menu options

Ctrl (Command), Alt (Option)

Ctrl + Move = snap

Ctrl + Pan Behind (Anchor Point) Tool = snap

Alt + draw shape = editable shape

Alt + drag keys = scale time between keys

Right-click on keysframe for Keyframe Assistant and Keyframe Interpolation...

Right-click on Position Transform and choose Separate Dimensions to separate the x and y coordinates

File > Project Settings...

Edit > Preferences

Edit > Duplicate *(to duplicate a Composition)*

Composition > New Composition...

Composition > Composition Settings

Composition > Add to Render Queue

Animation > Reveal Properties with Keyframes

Layer > Transform > Centre Anchor Point in Layer Content

Layer > Transform > Centre In View

Layer > Mask and Shape Path > Set First Vertex

Layer > Pre-compose...

Shape Layer's Transform shows the animation path

Contents Transform does not show the animation path

Frame Rates

Myelinated nerves can fire between 300 to 1000 times per second in the human body and transmit information at 200 miles per hour. What matters here is how frequently these nerves can fire (or "send messages").

The nerves in your eye are not exempt from this limit. Your eyes can physiologically transmit data that quickly and your eyes/brain working together can interpret up to 1000 frames per second.

However, we know from experimenting (as well as simple anecdotal experience) that there is a diminishing return in what frames per second people are able to identify. Although the human eye and brain can interpret up to 1000 frames per second, someone sitting in a chair and actively guessing at how high a framerate is can, on average, interpet up to about 150 frames per second.

The point: 60 fps is not a 'waste'. 120 fps is not a 'waste' (provided you have a 120hz monitor capable of such display). There IS a very noticable difference between 15 fps and 60 fps. Many will say there IS a noticeable difference between 40 and 60 fps. Lastly, the limit of the human eye is NOT as low as 30-60 fps. It's just not.

The origin of the myth: The origin of the myth probably has to do with limitations of television and movies. Movies, when they were recorded on film reel, limited themselves to 24 frames per second for practical purposes. If there is a diminishing return in how many frames people can claim to actually notice, then the visual difference between 24 fps and 60 fps could not justify DOUBLING the amount of film reel required to film a movie.

With the advent of easy digital storage, these limitations are mostly arbitrary anymore.

The numbers often cited as the mythological "maximum" the eye can see are 30 fps, 40 fps, and 60 fps.

I would guess the 60 fps "eye-seeing" limit comes from the fact that most PC monitors (and indeed many televisions now) have a maximum refresh rate of 60hz (or 60 frames per second). If a monitor has that 60 fps limit, the monitor is physically incapable of displaying more than 60 fps. This is one of the purposes of frame limiting, Vsync and adjusting refresh rate in video games.

The human eye can physiologically detect up to 1000 frames per second. The average human, tasked with detecting what framerate he/she is looking at, can accurately guess up to around 150 fps. That is, they can see the difference in framerates all the way to 150 fps.

Aninda Dutta, Student at KIIT University (2016-present)

Why 29.97 fps not 30 fps?

It is fairly common knowledge that the video on your TV is playing at 30 frames per second (fps) — unless you live in europe where it is 25fps. However, have you ever thought about why these are the frame rates? Why not 50 or 100? You probably haven't, but since I think about moving pictures all day I actually know the answer to this.

The main thing I would like to point out, which some of the geekier of you might already know, is that 30fps is just an approximation of the actual frame rate of video in the US. The real framerate is 29.97fps. Why this incredibly strange number you say? Well, I'll tell you.

In order to make video play back at a fixed rate there needs to be some kind of timing circuit. When television was first beginning, there weren't any of the high tech silcon-based chips that we used for this task today. So the brilliant engineers back then used the oscillation of AC electricty as the basis for their timing circuit. In the US, electricity cycles at 60 times per second (60hz.) So using half of that gives us the frame rate of 30fps. (In Europe, electricity flows at 50hz. 50/2 = 25fps)

So the frame rate of television was actually exactly 30 frames per second at one point in time. However that all changed when color television was introduced. When a signal for color information was added to the television transmission there was a big problem. The color carrier signal was phasing with with the sound carrier signal because they were very close in the spectrum. This made the picture look un-watchable. The quick fix they came up with was to reduce the framerate by .03fps which moved the two signals out of phase.

We have been stuck with this frame rate ever since.

Source: Wikimedia Commons

Further information

Drop frame:

https://www.connect.ecuad.ca/~mrose/pdf_documents/timecode.pdf

NTSC and PAL:

PAL = Europe

NTSC = America

https://ihffilm.com/videostandard.html

Getting extra help

Course Clinics
The IT Learning Centre offers bookable clinics where you can get pre- or post-course advice. Contact us using *courses@it.ox.ac.uk*.

Study Videos from Molly
Molly is our collection of self-service courses and resources. This includes providing LinkedIn Learning video-based courses free to all members of the University. Visit *skills.it.ox.ac.uk/molly* and sign in with your Single Sign-On (SSO) credentials.

Some courses recommend pre- and/or post-course activities to support your learning. You can watch these online videos anywhere, anytime, and even download them onto a tablet or smartphone for off line viewing.

If you need a quiet place to work through learning activities away from distractions, the IT Learning Centre offers 'qu**iet**' sessions where you can book a place. These are scheduled frequently during normal term times.

About the IT Learning Portfolio online
Many of the resources used in the IT Learning Centre courses and workshops are made available as Open Educational Resources (OER) via our Portfolio website at *skills.it.ox.ac.uk/it-learning-portfolio*.

Find the pre-course activity for this course in the IT Learning Portfolio: visit *skills.it.ox.ac.uk/it-learning-portfolio* and search for "Adobe After Effects".

About the IT Learning Centre
The IT Learning Centre delivers over 100 IT-related teacher-led courses, which are provided in our teaching rooms and online, and we give you access to thousands of on-line self-service courses through Molly (powered by LinkedIn Learning).

Our team of teachers have backgrounds in academia, research, business and education and are supported by other experts from around the University and beyond.

Our courses are open to all members of the University at a small charge. Where resources allow, we can deliver closed courses to departments and colleges, which can be more cost-effective than signing up individually. We can also customize courses to suit your needs.

Our fully equipped suite of seven teaching and training rooms are usually available for hire for your own events and courses. For more information, contact us at *courses@it.ox.ac.uk*.

About IT Customer Services
The IT Learning Centre is part of the Customer Services Group. The group provides the main user support services for the department, assisting all staff and students within the University as well as retired staff and other users of University IT services.

It supports all the services offered by IT Services plus general IT support queries from any user, working in collaboration with local IT support units.

The Customer Services Group also offers a data back-up service; an online shop; and a PC maintenance scheme. Customer Services is further responsible for desktop computing services – for staff and in public/shared areas – throughout UAS and the Bodleian Libraries.