The training started on the 30th July to 1st August 2014 as a special request from the ICT Staff. Registered ICT staff members who turned for the training formed the target group with all 100% of the turnout being from ICT. The 15 ICT staff who turned up for the training were introduced to the objectives of the training.

**Day 1**

Pre-evaluation forms were given to the participant to fill with an aim to assess:
1. How they came to know about the training. 7% of the participant responded as having done so through networking and 93% through email invitation.

2. Which Esri product they have used. All of the respondents reported having not used any of the GIS software and this gave further evidence for the need of this training.

3. What they would like to learn most from a list of choices and what is their expectations at the end of the training. 12% of the participants who came to the training did so, so that they could use the knowledge gained to complement their profession. 65% came to learn how to use ArcGIS. This demonstrates a need for further training to staff at Kenyatta University. Figure 1 shows the response toward the expectation of the training.

![Figure 1: Expectation of the training.](image)

**Figure 1: Expectation of the training.**

**Objectives**

The main objective of the training was to teach the student how to use ArcGIS as a tool for GIS. The other objectives aimed at introducing the participant to:

i. what is GIS

ii. what is ArcGIS

iii. what ArcGIS can do

This was achieved through giving an overview of what is GIS, how it is related with our Environment, that GIS is not for specific type of people but for all professionals. Prof. Onywere
did a thorough introduction of what is GIS. ArcGIS introduction was aimed at bringing out the
difference between GIS and ArcGIS. A lot of emphasis was put toward the use of GIS in ICT.
Participant were therefore prepared to what approach will be taken to make them appreciate
ArcGIS as a tool for GIS in ICT and demystify the belief that ArcGIS is a complicated tool to
use.

Low uptake of the use of ArcGIS software in ICT has necessitated the confiners of the training to
come up with the best approach to teach the participant how to start off with ArcGIS on their
own and in a very simple to people who have never had any training on ArcGIS software.

In this training, after the concept of GIS was introduced to the participant, the teaching approach
that was adopted for the ArcGIS software was to train using slides prepared with data pre-copied
to the computers the participants were using. The copied Student folder contained two folders as
shown in Figure 1. Each folder contained different datasets that aimed at exposing the
participants to handle data of all types.

Figure 2: Student Folder Contents
The flow of the training combined the doing and the explanation in a step by step approach. This approach was adopted because in most of the cases when a new technology is introduced to the users, the biggest challenge is usually how to start using the software and how to navigate using the available manuals. Manuals that are general to the end users sometimes do not consider the very basic concern of people who are not exposed to the technology at the lowest level. This therefore put off those who are not technologically oriented. The challenge is common to most staff and students especially in developing countries.

In the first day of training, the basic explanations of Esri Arcline of tools; ArcCatalog, ArcMap, ArcGlobe, ArcScene, ArcTool boxes and ArcReader were mentioned to the participant. ArcCatalog was taught from start menu, program files, ArcGIS path to show the participant where the software is installed in their computers (Figure 3).

![Figure 3: Starting ArcCatalog.](image)

This basic approach gave the participants exposure on the actual path to follow in the absence of shortcuts created or when they are using computers different from their own. Extensive
explanation of the ArcCatalog was given and participant used their computers to open the ArcCatalog and connect to the Student folder containing the pre-copied data. A folder connection session in a Catalog Tree was demonstrated during the training. The ICT staffs were excited to be able to follow the trainer’s step by step and a lot of interest could be seen by the keen and high concentration during the training sessions.

The next step introduced ArcMap using the same approach (Figure 4) and participant shown the similarities and difference of the ArcMap as the main working environment and the ArcCatalog as a data exploration tool. This culminated with doing some exercise to start ArcMap, to locate the ArcTool box and closing the software. This ascertained that the ICT Staffs can be able to start the ArcMap program on any computer even when no shortcuts are created on the desktops.

![Figure 4: Starting ArcMap 10.1 from the Start.](image)

Geoprocessing tools were demonstrated in a slide. This was in preparation to an exercise that drew a lot of interest to the ICT Staff members using the buffer tool. Figure 5 shows the Geoprocessing tools where the buffer tool was used to create buffers of the wireless hot points according to their broadcasting Range.
Figure 5: Geoprocessing Tools

Figure 6 shows the Modelbuilder slide that was created in class to demonstrate how easy it is to drag and drop the data source, the tools to work on the data and the output folder for the preceding data. Some of the ICT staff participants who are conversant with programming could not hide their appreciation of how easy it is to use the model builder.

Figure 6: Modelbuilder window.

**DAY 2**

Day two was a link up of the first day but geared to have more exercises that opened a lot of explanations to the type of data, the ArcTool box, the data conversion and data projection (Figure 7).
A map preparation and presentation closed the afternoon. Participants were taken through the process as they did it on their computers to come up with a map. Data on the map of Kenya from the Students folder was used for this exercise. Students were shown how to add data from the connected folder into a blank data view in ArcMap. Projection of the County Layer was used to project the data from WGS84 Geographic Coordinates to UTM Arc 1960 projected system that is used in Kenya. The attribute table was explained in details and used to produce a report.

The data Layout view was explained as participants prepared their map and inserted map objects (North arrow, Scale bar, Scale, legend, etc) making the whole training enjoyable. Each participant prepared his/her map of Kenya and inserted ownership text and exported the map to a pdf format. This proved to the participants that indeed they can use the software to produce their own map which can communicate to the intended map user. Figure 8 shows one of the map produced by an ICT student.
DAY 3

Day three started off with a summary of what was done in day two to bring the participant up to speed with what they were taught. The training took the participants through a geoprocessing excise where creation of; ICT_Roads, ICT_Buildings and ICT_NodePoint, Node_Buffer and
Node Coverage feature classes was done to start off the exercise. Figure 8 shows the ICT folder containing the feature classes created.

![ICT Feature classes Folder](image)

**Figure 9: ICT Feature classes Folder.**

Due to the demand of more practical on how to start off from scratch when no data is available, the ICT group was taken through a data capturing stage from the online satellite image data also available in the student folder. Using the existing Kenyatta University Boundary as a guide, the participant zoomed to KU and activated the Boundary layer to start editing. They were shown how to digitize the boundary following the image and how to trace from the existing one. After the KU boundary was created, road and building features were digitized (Figure 10). The interest of the group was how they can be able to map their network cables, their wireless hot spots and all the labs that are used for ICT trainings.
This made the ICT group appreciate that ArcGIS is a user friendly software and powerful in data capturing and presenting different features. This exercise was used to give the student a hand on training in the actual data capturing of a feature from satellite images as a data source.

The afternoon session closed the three day training with introduction to Remote Sensed data. Satellite imageries pre-copied to the Student folder in the computers were used to explain how different bands record different set of data according to the reflecting wavelength. The student were taken through the exercise of adding each band and explained what is contained in it. This was done by asking them what they could see reflected more. Knowledge of the data by the trainer guided the class to understand different band reflectance capability. Features reflected in the bands were identified e.g. the Aberdare forest, the Limuru tea zone, the Kitengela-Athi plains, the Ndakaini dam etc. A combination of all the bands in a stack layer (Figure 11) was used to change the bands color to mimic the natural colors as identified by the class.

Figure 10: KU ICT digitized map.
This was aimed at exposing the student to Remote Sensing as a set of data source for GIS. Students appreciated the power in data acquired by satellite as they could see on their screens areas they were familiar with. An exploration of a 0.5 m high resolution image from QuickBird of a section of Nairobi for 2013 closed the training. Participants appreciated the differences between high and medium resolution images and also different coverage in term of Area.

Figure 11: Remote Sensed Data

Video clips of all the sensing training sessions were captured and are available on the website. Attendance of students from day one was consistent, with the 15 student attending all the sessions.

Post-evaluation forms were filled at the end of the training session and the participants were encouraged to continuing using the GIS Labs to practice what they were taught before they come back for the applications training in just about a month. The aim of the Post evaluation was to gauge the overall rating of the training:
1. How the participants can be able to apply what they were taught. Over 70% of the respondent indicated they could apply most of what was trained.

2. Would you recommend this training to others? 100% yes
   - Did the course meet your expectations? 100% yes
   - The course material was 100% clearly presented
   - Will you attend phase II of the training? 100% yes

3. Item liked most during the training. Practical based scored 67%.

The overall rating of the training is illustrated in the following figure 12.

![Figure 12: overall Rating of the training.](image)

There was an interactive session at the close of the training where ICT group requested ArcGIS to be installed in their office computers which have met all the requirements to be hooked to the domain.