Your Complete Astro Photography Solution

Some of this course will be classroom based. There will be practical work in the observatory and also some of the work will be done during the night.

Our course is aimed at beginners or those students fairly new to imaging. We have a week to try and get you imaging. Remember that some people take years to accomplish this, so although we will be going through the course content in one way or another, we are aware that the most important thing is to make sure that you understand the procedures and what you are being taught. People learn at different speeds as well, so we ensure that this is taken into account on an individual basis to give you a quality experience.

Our aim is for you to go away with a solid platform for you to develop and to grow with in time. Astrophotography is built from a set of fairly complicated procedures that have to all work together to get an end result of an image.

Sadly there is no quick fix for the learning curve that we all have to go through, but that's the challenge that makes this one of the most rewarding of hobbies.

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Course content

Introduction to the kit required for AstroPhotography

- *EQ Mount* – Why do we use the EQ mount for imaging? Differences with Alt/Az and why it can't do long exposures Different parts of the EQ mount
- *Telescope* – Different field of views Why we use different types
- *Camera's* – DSLR's CCDs Mono or OSC Bayer matrix Different sensor sizes
- *Guiding* – What is guiding Why do we do it What does it achieve
- *Power considerations* – Battery Mains power

How the kit fits together – Practical work

- *EQ mount basics* – Demonstrate how it works How to align a finder scope How to set up and level a tripod
- *Mounting options* – Different types and fittings Scope rings Different thread sizes
- *How the scope fits on the mount*
- *Where to put a guidescope*- Different ways of guiding Preventing differential flexure
- *Connecting the camera* – *Adapters required*

Mount essentials for imaging

- *Balance*
- *Polar alignment*- How to ensure setting circles are correctly set Importance of Polar alignment How can you tell when your polar alignment is not good?
- *Steady and firm mount*
- *Calibration of the Polar scope*

Telescope differences – Hands on practical with different telescope types

- *Refractors* – Explanation of the differences
- *Reflectors*
- *SCT (Schmidt Cassegrain telescope)*
- *Ritchey Chretien*
- *The advantages and disadvantages of each type and their best uses* – *Collimation requirements*

Cameras

- *DSLR's* – Settings ISO RAW or Jpeg
- *CCD's* – Mono and One Shot Colour Filters Filter wheels Narrowband
- *Advantages and disadvantages of all types* – Light pollution Getting complete data sets Versatility PC automation for capture Cooling Noise Data quality

Guiding – What is it and why

- *Benefits of guiding* – Long exposures and their importance and relevance
- *How to set up guiding* – Guide scope Guide camera PC automation
- *Off Axis guider* – What is it How does it work What are the benefits

PC Automation

- *ASCOM* – Their use and benefits How to install How to use it Hardware needed
- *Ensuring that all key parts work together* – Filter wheel Camera Mount Guiding Capture programme Cables required

Setting a target

- *Field of view of imaging scope* – Large target Different sensor chip size and how this affects the target How to create a mosaic
- *PC programmes used to help select targets* – The movement of the sky and constellations Getting to the same target night after night
- *Deciding on exposure length* – Target dependant Moon interference Light pollution Camera dependant Speed of telescope and how it affects the amount of data captured Tracking accuracy Target brightness Bright objects nearby that can affect your exposure choice
- *Programming exposures* – How to use a PC for automation DSLR and remote settings
- *Framing the target* – Ensuring that the target is centred in the frame Best framing if there are multiple targets
- *What type of target is it* – Different nebula types Galaxies Planetary nebulas
- *Catalogues for selecting targets* – NGC IC Messier Many different catalogues depending on targets
- *Narrowband or LRGB filters* – Some targets are better in different filters How to decide

Important factors in images – Gathering data practical night time work

- *Focus* – Manual focus FWHM Bahtinov mask Automatic focus
- *Checking frames* - Ensuring that your data will be good Check for saturation levels
- *Mount essentials* – Star alignment for goto
- *Software to use for data capture*

- *Camera orientation* – Benefits of keeping the camera at the same orientation
- *Multiple exposures* – High Dynamic range targets Benefits of different exposure lengths
- *Aligning data night after night*
- *Drift alignment techniques*

Calibration files

- *Bias*
- *Flats*
- *Darks*
- *Purpose of calibration frames* – Examples of data with and without calibration frames Why we use them and their importance How do we take them Ensuring that you have good calibration files

Programmes / Software

- *Required programmes* – How to install them How to ensure they are properly working What do they do

Data Processing

- *Programmes available-* PixInsight Photoshop Photoshop actions
- *How to combine data* – Picking the best data Sorting the data How to calibrate data with calibration files How to merge the data to create a single file Creating a colour image from a mono camera
- *Gradient removal tools* – PixInsight processes Gradient removal using PS plug ins (HLVG)

- *Starting to show the detail in an image* – Basic stretching Sharpening the data Noise reduction Colour saturation Colour balance
- *Merging different exposure lengths to retain detail*

The data processing part of the course is designed to give you an overview of the techniques required to get an image. We will be doing the best to give you enough information without frying too many brain cells!