Course outline: Visual Effects

The MA in Visual Effects is a specialisation within the broader **MA in Film and Television**.

The course represents a steady progression, beginning with the basic technology and skills and ending with the responsibility for designing, planning and finishing VFX on a range of graduation film, television and games projects. At each stage, additional skills are added through specific workshops to provide a comprehensive education that is of great value in understanding and communicating with other industry professionals.

Using the latest equipment and technology, or their initiative to find a creative solution, students work on a variety of NFTS productions, as well as departmental exercises and cross-disciplinary workshops.

By the end of the course, each student will have evidence of work in:
- Previsualisation, assets, lighting, environments, compositing or real time content
- Creation of Graduation Showreels
- Specific examples of individually specialist work in the creation of VFX

The first year of the course is focused on teaching the range of advanced craft skills and the underpinning learning and education required for students to develop the mastery they need to progress their creative potential and deep learning.

The second year allows students to continue this development and demonstrate their creativity through practice. It ensures the students become independent learners often generating their own self-set briefs or working with teams of students on projects.

Throughout the course, students engage in specialist workshops, collaborative projects with students from other departments (for example Production Design, Cinematography and Model Making). Many first-year projects and graduation projects involve a range of VFX. An example of second year activity is the Animation Graduation films that involve the MA VFX students who supervise and manage the finishing of the films, as well as the production of the VFX work – often helping with the animation pipeline from scripting stage right through to delivery.

Commitment and motivation are essential throughout the course and a willingness to engage in debate and discussion to try to find creative solutions to problems encountered.

Good, open communication between students, tutors and coordinators is absolutely vital from the beginning

to the end of the course.

Technical and Creative Tuition Year One

Workshop 1a: The Common Agenda (Springboard)

This series of lectures, presentations, demonstrations, seminars, masterclasses and practical exercises are common to all the MA specialisations and are designed to illustrate what is involved in the work of each of them and how this expertise fits into the jigsaw of production. These events are designed to introduce the students to a common language within the NFTS and a solid, basic understanding of the principles of filmmaking and television and games production.

Workshop 1b: The Fundamentals

This is an essential introduction or recap of pixels, bit depths, formats, rgba channels, sub division and polygonal surfaces, xyz and 3d space, aspect ratio, naming conventions and the studio pipeline; video legacy; colour spaces and colour management, lenses and camera theory, VFX and picture post production job roles.and other technical fundamentals that often blocks progress later in the learning process.

Some sections of this module may also fall naturally into place during other learning modules. By the end of the first-year other topics covered may include: post production processes – traditional and digital; an intro to colour and Digital Intermediate Pipelines and the ACES colour system; scripts, storyboards and pre-visualisation; Scheduling Workflows, VFX Production and Budgeting

Elements of these sessions can be repeated at different stages throughout the course, adding additional information and tuition as and when required.

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Module 1: Take One Painting (TOP)

This is the very well known and respected first module on the MA. Take One Painting is a cross-specialisation exercise that allows for a collaborative approach to be taken on a practical film project for the first time on the course. It begins with the Year 1 Production Design students creating a set that exactly replicates a fine art painting, for example by a Dutch master. The Year 1 Cinematographers light the set and film the action, and then the VFX students create a digital matte painting (dmp) based background outside the set, but extending it – taking visual clues from the painting. The VFX students then create a composite image of the results for discussion and assessment.

Students work closely together to form good relationships and a practical understanding and awareness of each other's roles, as well as learning new practical and technical skills on a green screen set with digital camera kit and a full crew. On-set diplomacy is a vital skill for the VFX students with ambitions to become VFX Supervisors later in their careers. Once filming is complete, the VFX students work on their own version of a tutor led DMP environment design – practicing 2.5d VFX techniques and the interoperability between

different software tools learnt in workshops 1b, 1c, 1d, 1e, to create the required dmp based composite shot. Each student then presents their own version of Take One Painting shot for assessment.

Following the tremendous success of previous exercises, the industry advisory panel rated this project as one of the most realistic and relevant in VFX education in the UK.

Three workshops give the initial key skills needed to complete each students Take One Painting Project. A range of smaller challenges, shot based exercises and reviews build the basic skills and provide an important foundation to the traditional VFX pipeline used in industry. Workshops in Camera Tracking, Maya and Nuke are wrapped into the Take One Painting Module's tuition. The difference in mode between taught sessions and studio sessions will be clearly explained and expectations around conduct during these sessions will be clearly defined before we start with the workshops outlined below.

Workshop 1c VFX Camera tracking

Still considered the first principal in VFX – the camera's view point is everything. This reflects the orthogonal view that the Production Designer's will also draft the set design from (with reference to the chosen painting). Students learn about the importance of Film Back, lens focal length and format aspect ratio, camera mapping, object tracking, point clouds, geometry, parallax, placement and specification of tracking markers, classification of camera movement, fixed and prime lenses, track error rate and user defined tracks. At the end of the workshop, students need to feel confident in solving their own camera and reference geometry that can be exported into both Maya and Nuke.

Workshop 1d: CG Fundamentals: Digital Matte Painting (DMP)

This workshop is the important foundation in CG (often called '3d') VFX. VFX specialists will undertake step by step training in the basics of Digital Matte Painting (DMP) using Maya. Hard surface poly modelling for the core of the training, but learning also about appropriate sourcing of reference, camera projection, parallax, perspective, scale, resolution, matching pixel fidelity to a photographed plate and how layout and the hold out geometry that comes from the onset scanning process is always the first stage of the cg pipeline in traditional VFX work. The concept of basic scene segmentation and exporting geo and projected textures from Maya, to enable iteration in grading effects, depth of field and light interaction in compositing will also be explored. This workshop is the prerequisite for cg (3d) sub div modelling, surfacing, look dev and lighting taught later on in the course.

Workshop 1e: Compositing Fundamentals in Nuke

This workshop runs alongside the 3D CGI tuition in workshop 1d and aims to introduce the Students immediately to the practical and theoretical techniques involved in photorealistic digital compositing; marker removal, edge restoration, match grading, green screen keying, masking, rotoscoping, paint and shot finishing are all taught. VFX students learn the first principles of how grading and layering operations work as they can then be

applied to any of the available VFX applications, ending with the final composite for the Take One Painting project.

Workshop 1f: Foundation in On-Set Data Capture

Students work in small groups and learn the process of capturing HDRI's, set surveying, texture photography and who to ask for information on set.

Workshop 1h CG Fundamentals: Assets

This workshop comes at the end after a final review and hand-in of the Take One Painting DMP shots. VFX students go on from this foundation to build an onset prop, matching the texture and look dev to a physical prop. This workshop moves skills on from workshop 1d, here students learn about sub div modelling, UVing and texturing form photographs sourced from the Take One Painting Set. In terms of processing correctly usable data from onset texture photography, this workshop ties into workshop 1f, the Foundation in On-Set Data Capture.

Workshop 1i: CG Lighting and aovs - Non-Real Time Rendering

In this workshop students learn about how Image based lighting is used, to light a basic prop, so that it matches a real world reference. Techniques of calibrating light data to a colour chart ref, light from HDR versus sonometric approaches, path tracing optimisation, materials and render layer settings, basic primary, secondary and utility aov rendering from Arnold. Using Nuke in a multichannel/exr workflow and with AOV templates to adjust grading for verisimilitude and art direction. In terms of processing correctly usable lighting data from onset, this workshop ties into workshop 1f, the Foundation in On-Set Data Capture

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Module 2: Motion Control, Miniatures and Previz (MOCO)

In this module – you will take on previz, sequence based VFX design, animation and work with more advanced onset and lighting data capture techniques, but gravitating more towards learning and inputting on the project as either a asset specialist or a shot specialist.

This is the module which has a motion control multi pass shoot of a miniature set and the addition of cg assets at its heart. There are technical skills to develop and the work we do towards the final brief, will purposely adapt to your interests in VFX specialism and skillset as you come from the first Take One Painting module. This module's technical training MUST serve the appropriate use and understanding of cinematic language and story.

As well as the project mentoring allowing each student to focus on and develop their area of specialist interest within asset or shot based VFX work, there is a big emphasis on engendering true collaboration within the VFX group – on the cg/asset side you're individual specialist work, in making assets, a render

camera, line-up

geometry and correctly balanced IBL sources, should be 'published' and then incorporated into a single Maya scene, taking care to ensure the VFX job scheme is used correctly. On the shot/comp specialist side, plate line up, colour management, aov grading, keying, shot finishing and understanding the cg pipeline on a collaborative project is important.

You'll work within, pre-viz/tech-viz, assets, digital matte painting (dmp), lighting/rendering and compositing specialisms as you make the film (details below). There is also a series of workshops in photogrammetry, tech visualisation, and on set lighting data (HDRI IBL) capture that everyone should learn to do confidently, as your skills will be called upon during grad season
.
The project brief is to make a short piece for screening in the cinema (and subsequent release on social media), which celebrates the collaboration between the Model Making and VFX

Workshop 2a: Hero Assets and Animation

Hero asset modelling, surfacing, UVing, look development and an introduction to rigging and animation; publishing and instancing in Maya.

Workshop 2b: Photogrammetry and Lidar Scanning

Compare the techniques – pros and cons, practical training in photo capture and use of Reality Capture software to build reference geometry form real world objects.

Workshop 2c: Pre-Visualisation and Tech-Visualisation

Using a low resolution cg model of the miniature, you will work up a number of camera moves, experimenting with different lenses, consider how the camera on the moco rig's volume creates the appropriate drama with height, movement, and the lens focal length, the concept of a legal camera and test placement of assets and how they might move.

Workshop 2d: Advanced On-set Data Capture

Shooting and processing IBL with ACES colour managed HDRI. Training in Lightroom, Photoshop, PTgui and Nuke.

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Technical and Creative Tuition Year Two

At this point in the MA programme, you continue to work as a team – in assets or shot based work, but you can specialise at a deeper level in Environments, Lighting, compositing or Real Time.

Module 3: The VFX Showcase Film

The students work as a full VFX team and will produce a (very) short film to showcase skills in Real Time VFX (and traditional VFX). Parts of the production will be digitally filmed on an LED stage

Training in Unreal Engine to create environments with library elements and light scenes is provided

Seeing the entire project through to completion will involve elements of editing, compositing and colour grading and offers an opportunity to work with composers and sound designers for music and sound FX.

The module attempts to lead on giving a good critical understanding of real time – in camera VFX. As this is a new module for 2022 and the technology is in flux, for clarity, we have thought about what you'll be learning in a technology agnostic way as possible.

This module is about:

- Learning how production designed assets are modelled to an appropriate scale - but how the same design exists as a practical set asset and a games engine asset-based asset
- Understanding how art department and production design work traditionally in completing a design drawing that we will model from
- Understanding how a DoP light's a set and about what he/she would want to control on an LED stage shoot - both in the games engine and practically - likely a mix of both. The idea of a VP gaffer versus a regular gaffer's role
- Learning how a scene is put together to build the environment, in the games engine that goes behind the production designed hero asset on the LED volume. This needs to tell a story and is more than a technical exercise (within this - we have to consider why we'd need an LED shoot as oppose to shooting the scene on location)
- Learning how to work with limitations and to always refer to what's the drama - what's the action, rather than lazily using the LED volume without thinking - just because we can. A reminder here that on all the master's programmes at the NFTS, technology choices should always be led by the drama/story we are trying to convey on screen
- To consider and learn about real-time camera tracking
- Lens choice and the fabric of the story will be worked out during a previsualisation process - building on the learning from the pre/tech viz processes in MOCO module. This previz film will need to be edited - so we can have conversations about the film with the producer, PM (who we need to help us scout a location), cinematographer, director (who we need to help us cast and direct actors), AD and sound design

- Understanding how to break down the script and consider what assets we need and how they will be built
- Understanding that using the current state of LED tech - is about environment soft light and images that are purposefully shot out of focus. cg assets that need to be created to make any environment that will be shot in focus are not going to be assets in the Games engine to go on the LED volume, but instead we will be using traditional VFX asset skills - building on the training undertaken in TOP and MOCO
- Understand the difference between onset grading versus shooting 'raw' and balance grading in post (in compositing).

Workshop 3a Training in Unreal Engine

Graduation Film & TV Productions and Games Portfolio

All through the 2nd year students have the opportunity to work together on amazing film and TV productions and games. Each of the directors from the five directing departments (Documentary, Science & Natural History, Television Entertainment, Fiction, and Animation and their team) and Games Design & Development - usually comprising one member of each of the other departments (Producing, Production Design, Cinematography etc.) - are given a budget, tutors and access to the all the NFTS resources to make a single film or TV project or Game to collectively display their newly acquired skills.

VFX students will team up with each of the directors and act as CG or Compositing Supervisor/Lead Artist for their final film or TV production, or help with Game assets. These genres tend to kick up a fascinating range of VFX work to be done. VFX students will work as a team across all the VFX requirements from the different genres (emulating a boutique VFX company).

These sometimes simple, yet often complex ideas and collaborations will take up the majority of the remaining time and resources for the second year of study.

Graduation Film Involvement in Year One
Collaboration with all Directing departments; Producers; Year Two VFX students

It is unlikely that the 1st year VFX students will escape for Christmas without being involved in the 2nd Year graduation films. The 2nd Year VFX students will be supervising, and be totally absorbed by, these films and will be able to call on the 1st Year VFX students for assistance for several months towards the end of Year One. These activities could be anything from assisting with helping on set to complex 3D requirements, along with plenty of chance to practice roto, clean up, compositing and tracking.

Cross Specialisation Activities Year Two

As a rule, the VFX students can be approached during the later stages of their time at the NFTS and asked to work on individual shots or sequences for individual projects. The students organise these projects themselves, all of which are overseen by the VFX department.

Work Experience and Collaboration Partners

The course collaboration partners offer live projects, short two week placements, masterclasses and take part in regular steering group meeting – consulting and shaping the MA VFX course curriculum. Our Partners in this regard are Time Based Arts (based in London), Milk VFX (based in London), One of Us, (based in London and Paris) and Ember Films (based in Norwich)

Work experience opportunities are more likely in the summer breaks in years one and two, or towards the last quarter of the programme. They could be for a period of between one and six weeks. Students may be formally assessed on their return to the School. Whilst we would like to be able to offer this opportunity to every course participant, we realise that we are at the mercy of the companies offering these opportunities. Despite any formal agreement between the NFTS and the individual companies, these arrangements are

often subject to change at the last minute. In the interests of equality and impartiality, it is therefore essential that the students understand that there is no guarantee that any such opportunities will happen.

In addition, since summer of year two tends to be a hectic time for the second-year students working on graduation film and television projects, it is extremely likely that this commitment may also limit the student's ability to accept a work experience opportunity, even if it is offered. That aside, many students in the past have accepted work experience opportunities that have led onto greater opportunities after the course.

Graduation Film Involvement in Year Two
Collaboration with all Directing departments, Production Design, Editors, Producers, Sound Designers and Year One VFX Students

The 2nd Year VFX students have the potential to be involved at some stage with all of the 2nd Year Graduation films. This is why the process begins for them from the beginning of year two to around Easter when they are involved at the scripting stage to identify any potential effects and shooting or pipeline requirements, and continue this involvement throughout the year until delivering the finished effects and/or delivering the finished game, film or television project. This involvement continues throughout the year, until delivering the final project, usually in November, December or January depending on the genre of production.

The objective is to give the VFX students the responsibility of working as a full VFX team across all the projects that require VFX from the documentary, animation, science and natural history and fiction film projects – as well as the TV entertainment and games projects. VFX students are charged with the group responsibility of planning, designing and delivering VFX and offering advice to directing teams on VFX methodology and in explanation of the VFX process.

During this process they liaise with the Producers and Directors to ensure that any VFX requirements are fulfilled. They have the option at any time of putting together and managing a team of artists from their own department (including year one students) if required, to ensure the effects are created on time.