

2018

The Xtracode Curriculum



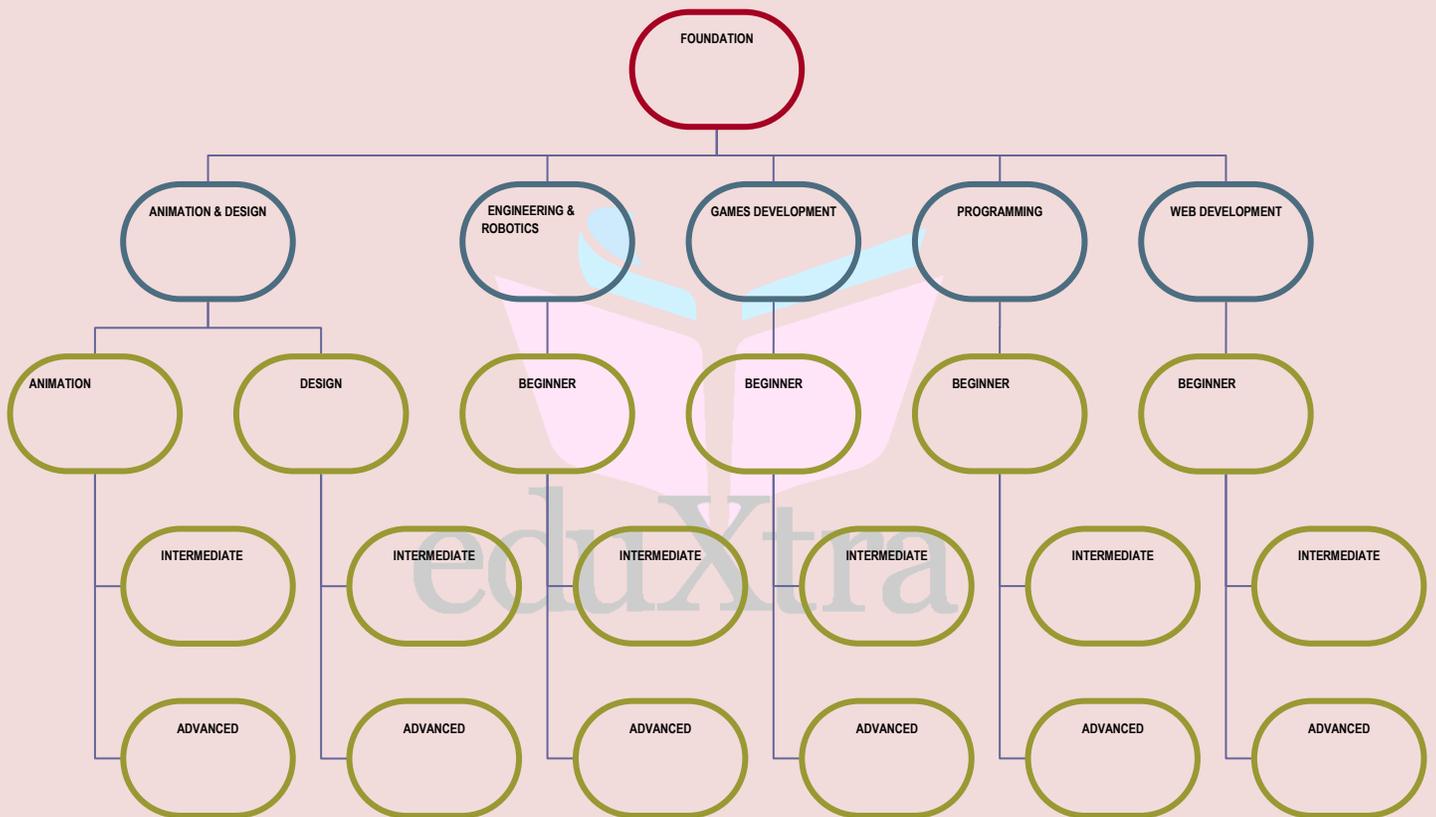
Premium Coding Classes for Kids &
Teenagers

Eduextra

7/25/2018

THE XTRACODE ADVANTAGE:

CODING CLASSES CURRICULUM



Foundation

Scratch Animation & Design

For beginner coders, animators, robotics, programming and web developers, Level 1 is the place to start. With no experience required, This Scratch Animation & Design course teaches students the foundations of computational thinking and block-based coding, while engaging their creativity at every turn.

At the center of Level 1 is Scratch, an MIT designed program that immerses students in the digital worlds they love. Learning Scratch allows them to build their own video games, animated stories, and musical compositions.

By the end of the course, students will possess the unique ability to combine their creative insights and personal interests through visual programming.

In addition to being fun and engaging, this course can help build college and career readiness.

Objectives

- Design simple algorithms and sequence animations in Scratch
- Create original sound compositions and characters
- Design their own original video games

Key Projects

- Developing a linear animated story
- Creating a growing garden
- Creating custom characters and song
- Building an interactive video game
- Creating personal emoji

Duration

- Two weeks

Units

Unit 1 | Principles of Visual Coding

Sequences and algorithms, as well as the computational problem-solving framework

Unit 2 | Exploring Scratch

Parallel sequences and debugging

Unit 3 | Loops and Algorithms

The roles of loops in algorithms and different types of loops in Scratch

Unit 4 | Advanced Animation

Wait blocks, customizing and creating new sprites, and making animations look more “real”

Unit 5 | Music and Sound

Conditionals and creating original sound compositions

Unit 6 | Gaming and Video Sensing

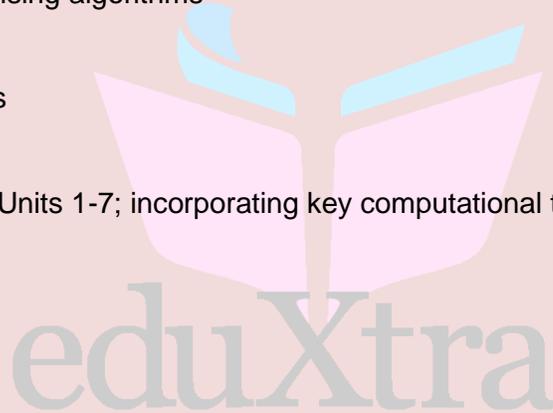
Variables and video sensing algorithms

Unit 7 | Lists and Inputs

Creating inputs and lists

Unit 8 | Final Project

Refining a project from Units 1-7; incorporating key computational thinking concepts and personal interests



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Exploring Engineering & Robotics

In today's world, almost everything we see is either a robot or was made by one! In Exploring Engineering and Robotics, students will use engineering principles to design their own multi-function robots.

Students will learn how to use circuitry to light up LEDs, build a truck robot that can navigate a maze, and code a line-following robot.

In this project-based course, students will get to experience first-hand how engineers solve real-world problems. By the end of the course, each student will have experience with mechanical, electrical, and software engineering principles.

This course will enable them to think critically to decompose problems and solve everyday challenges!

Objectives

- Design and build robots to solve complex problems
- Learn how to approach problems using the engineering process
- Use visual and text-based coding to design program for robots

Key projects

- Designing a circuit to turn on LEDs
- Building a maze-navigating robot
- Building a remote-controlled robot
- Writing a program that uses sensors
- Navigating a labyrinth using a robot and sensors
- Designing a multi-function robot

Duration

- One Month- 3 days per week

Beginner Level

Duration

- One Month- 3 days per week

Units

Unit 1 | Introduction to Robotics

Programming a circuit to turn on an LED

Unit 2 | The Engineering Design Process

Designing a robot to navigate an obstacle course in a time trial

Unit 3 | Loops and Conditionals

Building a robot that can be controlled via remote control

Unit 4 | Balancing Performance Optimization and Reliability

Incorporating infrared sensors to build a mobile robot capable of following a line

Unit 5 | Integrating External Hardware

Building a system that determines how close an object is to an ultrasonic sensor

Unit 6 | Maze Navigation

Designing a robot that can navigate a maze and make decisions

Unit 7 | Integrating Text-Based Programming into Robotics

Programming a robot using text-based coding - including variables, loops, and conditionals

Unit 8 | Final Project

Designing and building a robot that integrates several sensors to complete a complex task

Intermediate Level

Duration

- One Month- 3 days per week

Advance Level

Duration

- One Month- 3 days per week

Web Development

There are over a billion websites on the Internet, yet only a handful is widely visited. So what makes these few, like Google and YouTube, so popular? The simple answers are usability, utility, and engagement. In Web Development 1, students learn how to think like web developers. By utilizing industry standards like HTML, CSS, and JavaScript, students learn how to format code and where to place the main features of a web page to attract and hold users' attention.

The best websites and apps are ones that are dynamic - integrating APIs, widgets, personalization, and animations. In our Web Development 2 course, students advance their programming skills with a greater focus on JavaScript, the foundation of most dynamic websites. Students gain knowledge about incorporating user-input into a website, the keys of mobile development, and how to design web applications.

The course begins by teaching HTML and CSS, so students can start building their websites right away. Students move on to learning best design practices and how to develop a site that meets the demands of a variety of users, and then they learn the basics of JavaScript. At the end of the course, students will have created their own engaging, functional website built with all three fundamental coding languages.

Objectives

- Apply the fundamentals of web development to design a website
- Code and design websites using HTML and CSS
- Learn the basics of JavaScript to create a dynamic website

Key projects

- Keeping a design journal
- Creating a static website
- Creating an interactive website
- Developing a text-based story told using JavaScript
- Building a dynamic, web-based Mad Labs program
- Finishing a final website designed with HTML, CSS, and JavaScript

Beginner Level

Duration

- One Month- 3 days per week

Units

Unit 1 | Introduction to HTML
Starting to code with HTML

Unit 2 | Introduction to CSS
Designing and styling a site with CSS

Unit 3 | Bringing It Together
Using HTML and CSS to develop a static website

Unit 4 | Intermediate HTML and CSS
Learning about libraries for HTML and CSS

Unit 5 | Introduction to JavaScript
Learning the basics of JavaScript including how to display information on a website

Unit 6 | User Interaction
Taking information typed in by a user and incorporating it into the student's own program

Unit 7 | Design and Refine Your Website
Combining all they have learned to develop a website according to industry standards

Unit 8 | Final Project
Using HTML, CSS, and JavaScript to create a dynamic website based on the student's personal interests

Intermediate Level

Objectives

- Code web applications in JavaScript to create interactive sites
- Learn and apply mobile web development concepts to create interactive and dynamic websites
- Add buttons, maps, and other advanced functions to websites using HTML and CSS

Key projects

- Creating a program using JavaScript that asks the user for input
- Coding a program with JavaScript that animates a story the student has written
- Designing a mobile-friendly site
- Designing a website that uses the Google Maps API
- Designing an advanced website that is mobile friendly and includes advanced JavaScript

Duration

- One Month- 3 days per week

Units

Unit 1 | Fundamentals of JavaScript

The foundational concepts of programming in JavaScript

Unit 2 | Conditionals and Debugging

Learning how to have code run when an event, such as clicking a button, happens, and learning how to search for errors

Unit 3 | While Loops and For Loops

Making code repeat itself using loops

Unit 4 | Methods

Using methods to have code, like playing a video, occur when a play button is pressed

Unit 5 | Classes

Expanding the student's own website by creating linked files that load new WebPages when clicked

Unit 6 | Designing For Mobile

Updating a student's own site to make it mobile friendly

Unit 7 | Using API's

Adding Google Maps into a web application of the student's own design

Unit 8 | Final Project

Using advanced HTML, CSS, and JavaScript to create a web application that is mobile friendly

Advanced Level

Duration

- One Month- 3 days per week

Units

Module 1: JAVA (BACKEND)

Unit 1 | Introduction to Java

Unit 2 | A Hello World Program

Unit 3 | Java Comments

Unit 4 | Variables

Unit 5 | Primitive Operators

Unit 6 | Increment & Decrement

Unit 7 | Strings

Unit 8 | Getting User Input

Unit 9 | Module 1 Quiz 1

Module 2: Conditionals and Loops

Unit 10 | Conditional Statements

Unit 11 | Nested if Statements

Unit 12 | else if Statement

Unit 13 | Logical Statements

Unit 14 | The switch Statement

Unit 15 | While Loops

Unit 16 | For Loops

Unit 17 | do while Loops

Unit 18 | Module 2 Quiz 2

Module 3: Arrays

Unit 19 | Arrays

Unit 20 | Summing Elements in Arrays

Unit 21 | Enhanced for Loop

Unit 22 | Multidimensional Arrays

Unit 23 | Module 3 Quiz 3

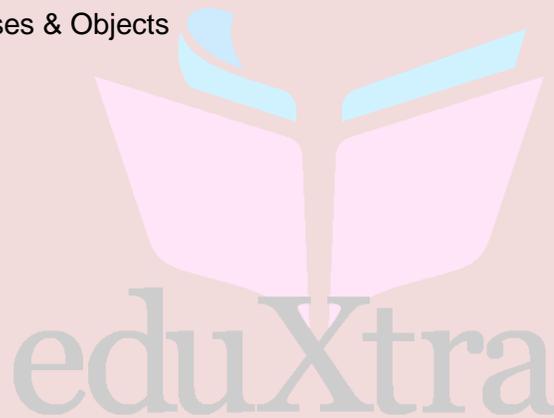
Module 4: Classes and Objects

Unit 24 | Object-Oriented Programming

Unit 25 | Methods

Unit 26 | Method Return Types

Unit 27 | Creating Classes & Objects



JAVA WEB (JSP)

Duration

- One Month- 3 days per week

Units

Unit |1| Planning the Structure

Unit |2| Creating a New Project

Unit |3| Preparing the Web Interface

Unit |4| Preparing Communication between the Application and Database

Unit |5| Adding Dynamic Logic

Unit |6| Creating API's

Unit |7| Running the Completed Application

Unit |8| Troubleshooting

Unit |9| Choosing the right server

Unit |10| Uploading to a live server

Unit |11| Site security

Game Development

What makes a game fun and addictive? Why can some games hold your attention for hundreds of hours, while others end up gathering virtual dust? In Game Development with Java, students look at the tenets and industry-standard practices that have propelled such games as Minecraft, Run escape, and Puzzle Pirates to huge success. They will then design their own game based on these tenets, blending their own creativity and experience to create a captivating gaming experience.

By programming in Java, students learn how to use Object-Oriented Programming (OOP), an advanced computer programming paradigm that enables students to organize their code more effectively. At every step along the way, students will learn best practices widely used by professionals at companies like Twitter, Amazon, and Google. They will build upon their existing computational thinking skills to get ready for a career in game development.

Objectives

- Design a game using industry-standard best practices
- Learn how to program in Java
- Build a complete game in Java

Key projects

- Designing a game that engages players through operant conditioning
- Building a game of tic-tac-toe
- Building a game of connect4
- Building an object-oriented calculator
- Writing a greedy pathfinding algorithm
- Building a platforming game

Beginner Level

Duration

- One Month- 3 days per week

Units

Unit 1 | Game Design

Learning how game designers use design principles to help make fun and engaging games

Unit 2 | Object Oriented Programming

Learning the basics of Java programming

Unit 3 | Java Class Hierarchy

Learning how Java classes extend from each other

Unit 4 | Polymorphism

Learning about polymorphism

Unit 5 | OOP Best Practices

Learning best practices when writing code

Unit 6 | Data Structures

Learning about different data structures and the pros and cons of each

Unit 7 | 3rd Party Libraries and Testing

Importing existing libraries into their projects

Unit 8 | Game Programming

Loading graphics and sound into a Java program

Unit 9 | Final Project

Using the skills learned from the previous session to complete the game they designed in Unit 1

Intermediate Level

Duration

- One Month- 3 days per week

Units

Unit 1 | Review of GUI and applets

Unit 2 | Working with OOP

Unit 3 | Threads

Unit 4 | 2D Arrays

Unit 5 | User Interaction

Unit 6 | Simple AI

Unit 7 | 2D Graphics

Using Screen Layout, Images, Transparency, Transformations & Animation

Unit 8 | Double buffering

Unit 9 | Sprites & more animation

Unit 10 | Sound Effects & Music
Unit 11 | Exercise – Battleship
Unit 12 | Tile Map
Unit 13 | Collision detection
Unit 14 | Scrolling
Unit 15 | Project – design and create a 2D game in Java

Advanced Level

Duration

- One Month- 3 days per week

Units

Module 1: Basics to mobile device game development in Java

Unit 1 | How Java programming is integrated in mobile technology

Unit 2 | Understanding J2ME

Unit 3 | Start programming

Unit 4 | Project – design and create a 2D game in Java for a cell phone

Module 2: An Introduction to Java 3D

Unit 1 | Understanding math for 3D programming

Unit 2 | Basic 3D programming

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Android App Development

Developing the next killer app isn't easy. It requires hard work, a lot of data, a little bit of luck, and the willingness to pivot. While no one can successfully predict what the next great app will be, our Android App Development course provides students the design, coding, and entrepreneurial skills to get them started in the right direction.

In this course, students learn the basics of design thinking, which is how great apps like Snapchat and Instagram were created. From there, the course dives into app development using Google's Android platform. By the end of the course, students will have their fully functioning app deployed to the Google Play store, with the knowledge of what it takes to build effective and engaging new mobile products.

Objectives

- Planning and executing an app blueprint
- Using UX and UI to design an app people will want to use
- Building their own app and deploying it to the app store using Android

Key projects

- Creating an app design plan
- Delivering the app sales pitch
- Developing the app prototype
- Building the app database
- Conducting user testing of the app
- Completing and deploying a fully functioning Android app

Beginner Level

Duration

- One Month- 3 days per week

Units

Unit 1 | Introduction to Apps

Learning about different kinds of applications

Unit 2 | Ideation and Discovery

The methods of ideation and coming up with an app idea

Unit 3 | Design and Planning

Creating a design document and pitch for the app

Unit 4 | Application design

Learning the intricacies of creating a pleasant user experience

Unit 5 | Event Driven Programming

Programming the app user experience

Unit 6 | Databases

Learning how to store data for the app

Unit 7 | Build and Test

Testing the app and deploying it to an Android device

Unit 8 | Advanced Android Configurations

Optimizing app configuration and deploying the app to the app store

Intermediate Level

Duration

- One Month- 3 days per week

Units

Unit |1 Creating activities to process user input

Unit |2 Implementing views to build the User Interface (UI)

Unit |3 Packaging applications for deployment

Unit |4 Developing unit tests

Unit |5 Supporting asynchronous behavior

Unit |6 Performing background tasks with services

Unit |7 Communicating with intents

Unit |8 Creating User Interfaces

Unit |9 Selecting visual components

Unit |10 Building the layout

Unit 11| Connecting a view to an activity

Unit 12| Positioning form elements

Unit 13| Working with resource declarations

Unit| 14 Declaring component definitions and layouts

Unit |15 handling multiple screen resolutions

Unit| 16 Localizing applications

Unit 17|Processing User Input

Unit| 18 Communicating with the user

Unit 19|Creating and displaying Toast

Unit 20|Generating status bar notifications

Unit 21|Logging key application events

Unit 22|Interacting with the UI

Unit 23|Responding to user input events

Unit 24|Launching activities with intents

Unit|25 Writing Java event handlers

Unit |26Generating context and option menus

Unit |27 managing the activity life cycle

Unit | 28 Integrating with the Android system

Unit 29|Persisting data in response to notifications

Unit 30|Persisting Application Data

Unit 31|Selecting storage options

Unit 32|Contrasting internal and external storage locations

Unit 33| Saving application configuration with Shared Preferences

Unit 34|Manipulating the SQLite database

Unit 35|Executing queries to locate information

Unit 36|Specifying column selections with projections

Unit 37|Consuming and creating content providers

Unit 38|Accessing shared data resources

Unit 39|Addressing content providers with URIs

Unit 40|Maintaining System Responsiveness

Unit 41|Avoiding Application Not Responding (ANR) errors

Unit 42|Unloading the UI thread

Unit 43|Designing for asynchronous execution

Unit 44|Building background services

Advanced Level

Duration

- One Month- 3 days per week

Unit

Unit 1| Launching Intent Services

Unit 2|Declaring services in the manifest

Unit 3|Exchanging Data over the Internet

Unit 4|Interacting with server-side applications

Unit 5| Synchronizing Android devices with servers

Unit 6 |Communicating via HTTP clients

Unit 7| Developing clients for web services

Unit 8| Connecting to RESTful services

Unit 9| Creating and parsing JSON

Unit 10| Enhancing the User Experience

Unit 11| Incorporating the Action Bar

Unit 12|Manipulating objects with drag and drop

Unit 13|Supporting orientation and multiple screen resolutions with resources

Unit 14|Combining fragments into a multi-pane UI

Unit 15|Leveraging geolocation and mapping capabilities

Unit 16|Plotting positions on Google Maps

Unit 17|Establishing location through GPS, Cell-ID and Wi-Fi

Animation & Design (2d Animation)

Beginner Level

Duration

- One Month- 3 days per week

Unit 1 | Art & Copy Preparation:

1. Story planning

- Make a series of flipbooks
- Make a rough draft
- Make a comprehensive layout
- Make a series of storyboards
- Typography
- Identify type fonts, styles and size

Unit 2 | Design Principles

- Identify methods used to achieve emphasis
- Identify types of balance
- Distinguish between good and poor Pattern Unity
- Identify methods used to achieve rhythm
- Elements of Design
- Line, Shape, Space, Value, Color, Texture

Unit 3 | Principles of Animation

- Timing
- Ease In and Out (or Slow In and Out)
- Arcs
- Anticipation
- Exaggeration
- Squash and Stretch
- Secondary Action

- Follow Through and Overlapping Action
- Straight Ahead Action and Pose-To-Pose Action
- Staging
- Appeal
- Personality

Intermediate Level

Duration

- One Month- 3 days per week

Unit 1 |History of Animation:

- Persistence of vision
- Thaumatrope
- Phenakistoscopes
- Zoetrope
- Flip Books

Unit 2| Stykz: Stick Figures:

- What is Stykz?
- Walking
- Running
- Final animation using 4 animation principles

Unit 3| Careers:

- Write a resume using technical skill
- Prepare a personal portfolio
- Research a job

Advanced Level

Duration

- One Month- 3 days per week

Unit 1 |. Creating Characters:

- Purpose
- Creating a Character
- Mouth shapes
- Body
- Legs
- Arms
- Hands

Unit 2 |2D Cut-Out:

- Characteristics of Cutout
- Simple Cutouts
- Openwork Cutouts
- Methods of Jointing
- Limitations of Joining
- Manipulating Cutouts
- Wear and Tear
- Animation with cutouts
- Full Colored Cutouts
- Controlling Moves
- Cutout movement style

Unit 3|Rotoscoping:

- Rot scoping a Simple image
- Painting an Alpha Channel by Hand
- Color Correction Part of an Image
- Special Effects

Unit 4| Stop-Motion:

- Claymation
- .View examples of animations
- Create a simple animation
- Create a stage
- Use cameras to take photos for animations
- Transfer photos to the computer

- Compile the project
- Add sound and titles
- Discuss some curricular uses of this technique

Unit 5 | Adobe Animate CC

- Workspace
- Motion Tween Animation
- Rotate/Scale
- Movement Speed
- Motion Path
- Frames
- Insert, remove, copy and move
- Preview Animation
- Scrubbing
- Controller
- Shape Tween Animation
- Frame-by-Frame Animation
- Sound, Video, and Interactivity
- Add Sound
- Export video

Animation & Design (3d Animation)

Beginner Level

Unit 1

History of Animation + VFX

It's often said that you can't know where you are going until you know where you've been and this is especially true for the ever changing animation industry. In this course, you will develop an understanding of animation in its historical context. Discover the pioneers, innovators, adapters, and the followers of animation as they explored the limits of this evolving art form. Examine the major events in animation to understand how trends, technological advancements as well as stylistic and cultural developments affect the industry. Lessons include lectures and the examination of milestone cartoons followed by discussions.

Design 1

This class focuses on the process of shot design as a team experience. Building on a solid foundation of research, this class teaches students how to work within a brief to create designs for characters, props, and locations. Students gain first-hand experience of how to visualize, communicate an idea, and create design documents.

Lighting 1

This course provides students with the principles and techniques of illumination using Maya and Mental Ray. The course emphasizes the use of light to create the illusion of shape and depth within a 2D medium. Students analyze techniques used by Renaissance artists, and see how those same techniques are used today in computer graphics. Students also explore different lighting scenarios for different times of day, as well as interior illumination with varying sources of illumination.

Modeling 1

In this course, students learn fundamental tools and techniques for prop modeling in Autodesk Maya, and examine the process of how to create models for a variety of applications. Students learn the importance of matching reference, and how to leverage reference to convey story ideas and contexts. Students also learn hard surface modeling techniques and how to model

accurately (and to scale). A full production style “pipeline” is applied to each model, taking the reference from design to proxy, and on to the final model. In later modeling courses, students will further explore areas of production using the models created in this course. Students’ projects are evaluated through a series of modeling exercises and assignments culminating in one large final project, a still life.

Surfacing 1

This course demonstrates the interaction of light on surfaces in the real world and how to recreate this phenomenon in a CG environment. The creation of realistic surface shades, in combination with effective texturing techniques, allows for the creation of high-quality, inorganic-surfaced models.

Career Prep

The Career Prep track is a workshop series delivered in 3-hour segments from Term 1 through 6. The key topics are intended to equip students with essential skill sets for pursuing employment in their industry and position of choice. Students will explore their preferred career paths, understand the importance of networking and social media, begin creating their web "brand," produce Industry-specific cover letters, and resumes, as well as examine strategies for nailing the perfect job interview. The year will cumulate in Industry Night in Term 6. Attendance is mandatory, and students will be evaluated based on attendance of workshops.

Animation 1

This course covers the basic principles of animation, and provides students with the basic understanding of timing. Students learn the fundamentals of weight and its direct relation to timing. They also learn to animate basic bouncing, wave motion, and a simple jump. Students are introduced to the animation toolsets in Motion builder, Maya, and XSI.

Visual Effects 1

This course introduces students to the fundamental skills used in the Visual Effects (VFX) industry. Students learn basic compositing and how the VFX field integrates computer graphics and 3D components with live action plates. Visual Effects 1 includes comprehensive practical exercises which simulate current industry pipelines. Students have access to experienced mentorship for discussion and feedback.

Unit 2

Previsualization

The art of previsualization allows you to generate preliminary versions of shots or sequences using digital tools in a creative and collaborative way. In this class, you will be introduced to previsualization as it pertains to film and television. Visual story concepts of line-of-action, staging, framing and composition will be covered. Students will work in groups and be provided with a 2D animated, which they will interpret into 3D shots. Tools used will include Maya and Premiere Pro.

Life Drawing 1

In Life Drawing 1 students are introduced to the principles of Life Drawing by exploring the observation of the human form. Study focuses on the principles of movement, weight, balance, shape, and anatomy through gesture drawing, long form poses, and humans in motion. The practice of observation and application is the foundation from which students apply these principles. Study in shading, shadow, foreshortening, and action analysis further allow students to explore the importance of observing the human form and anatomy.

Design 2

Design 2 focuses on colour theory, as well as introducing students to the different streams and the pitching/design process for demo reel production. The colour component consists of four classes with a classically trained colour artist. Students create a colour concept for designs to be used in their Term 2 modeling class. The demo reel component consists of three lectures that introduce students to the modeling, animation, and visual effects streams. Examples of past student work are discussed, along with an industry overview of the different disciplines. The pitching process is also covered in this class to prepare students for their Term 3 project pitch.

Lighting 2

This course expands on the principles and techniques of illumination using Maya and Mental Ray, with an emphasis on using light to create mood. Students gain an understanding of how to simulate indirect illumination, as well as how to separate a render into different layers, to be composited back together in Nuke. Students are exposed to different lighting scenarios and light a complex animated shot.

Modeling 2

This course covers the fundamental tools and techniques of character and hard body modeling within XSI and Maya. Students examine the process of creating various characters and learn the importance of line flow for deformation and shape. Students study modeling tools, including lattice deformation, enveloping objects, character rigs, point pulling, and expressions. These tools are applied to a series of modeling exercises and assignments, culminating in a free-form walk, to prepare students for the advanced modeling course and industry production.

Surfacing 2

This course outlines techniques to surface organic models effectively. From the application of shades to techniques for applying textures efficiently, students develop industry-accepted practices for surfacing characters and organic surfaces.

Rigging 1

Rigging a character is time consuming, and requires thoughtful planning. Students work through the process of rigging a proxy character. Emphasis is on creating a solid skeletal structure, including position, freezing and orienting joints, and building on top of this. Students are introduced to MEL scripting, Maya plug-in, and script installation to show the power of these aspects. The end result is the creation of a proxy rig that students use for their Term 2 animation exercises and assignments, and a Term 3 project.

Animation 2

Students learn how to cycle animation in Maya, and use various skills and functions to view their Silhouette ("7" key), arcs (Tracking markers), and line of action (Paint over's). Students begin to analyze the effect that outside weight can have on a character, and how they can use it to create the illusion of life.

Visual Effects 2

The purpose of this course is to familiarize students with the core skills used in the Visual Effects (VFX) industry. Students continue to gain practical experience through editing, compositing, and VFX, integrating computer graphics and 3D components with live action plates. Visual Effects 2 includes comprehensive practical exercises that simulate current industry pipelines. Students have access to experienced mentorship for discussion and feedback.

Intermediate Level

Unit 3

Pre-Production

This course prepares students for the production component of their studies. Students are guided through the different stages of pre-production for their specific project, and apply concepts learned in Terms 1 and 2 directly to their projects. Students are expected to research, explore, and iterate on their projects ending with a comprehensive pre-production package which consists of: Animated, Designs, and Research.

Lighting 3

This course builds upon the principles and techniques of illumination using Maya and Mental Ray, with an emphasis on using light to create visual interest or focus. Students closely examine the Mental Ray render engine to gain an understanding of the render equation and the importance of a linear workflow. Students continue to expand their understanding of colour and how to effectively use it as part of lighting solutions.

Surfacing 3

This course introduces students to the workflows and tools required to properly surface a character. From the skin to the clothing, students explore the shades, unwrap, and textures needed to create high detail and realistic-looking character surfaces.

Rigging 2

Students examine some of the more intricate ideas and techniques involved with the character set-up process. Students begin by looking at constraints to see the ways they can create inter-object relationships, and how to start the process of setting up faces using blend shapes and facial controls. At the end of this term, students have a solid bipedal rig that they can use for their short film.

Compositing

The purpose of this course is to digitally composite 3D-generated assets, which are typically used during compositing in the film industry. Students will continue to learn the methods by which computer generated elements can be integrated into live action plates, specifically, how these elements are digitally composited. This is a hands-on class where students will learn through practical experience. This course includes comprehensive practical exercises that simulate current industry pipelines.

Required Courses for Animation Stream

Animation 3

In Animation 3, students go through all of the steps involved in creating an animated sequence for a short film. Students work in groups to find a 10- to 15-second piece of dialogue to use for a short animated piece. Students go through thumb nailing the shots, blocking, posing, splinting, and then polishing the shots.

Life Drawing 2

Students focus on the principles of movement, weight, balance, shape, and anatomy through gesture drawing, long form poses, and humans in motion. The practice of observation and application is the foundation from which students practice these principles. Study in costume, props, and action analysis further allows students to explore the importance of observing the human form and anatomy.

Required Courses for Modeling Stream

Modeling 3: ZBrush

In this course, students explore Z-Brush fundamentals with a focus on how to work with imported geometry and environments. Students start with sculpting, building specific environment assets, and exploring the tools used to damage and retopologize a model. The term ends with a look at the model output process as students take their final into Maya for mapping, including vector displacement, 32bit displacement, normal maps, and rendering.

Sculpture

This course is designed to teach students how to move their ideas from a 2D state (i.e. drawing) to a 3D state (i.e. sculpture). This skill is useful for all facets of film and television. All ideas begin as sketches and blueprints that have to be realized by a sculptor. Students learn the secrets of transferring 2D images into 3D by using graphs and grids. They build armatures to size and scale, learn the techniques of blocking with Super Sculpey, and are taught the uses and functions of the traditional tools.

Required Courses for Visual Effects Stream

Visual Effects 3

The Advanced Visual Effects course includes comprehensive practical exercises that simulate a current industry pipeline. This includes planning, production, and effects production of a complete Visual Effects shot. Students have access to experienced mentorship for discussion and feedback.

Visual Effects: Data Acquisition

In this course, students acquire the skills to combine and composite the acquired digital assets from a green screen studio shoot and location shoot. Students will go out on location to shoot background plates, use a green screen studio to record foreground plates, and then throughout the term proceed to composite a visual FX shot from these acquired assets. Students will learn the camera and lighting techniques and compositing-specific criteria required to record these asset. In addition to Stead cam operating and the setup and execution of Dolly shots, there are also additional CG compositing exercises based on a pre-existing model that students work on throughout the term.

Unit 4

Creative Development

Presentations are a critical part of the learning process and simulate 'dailies' in a studio environment. Students present their project development to their classmates and a full team of staff. Feedback is given to the overall story and technical development of the project. Goals are identified to the student so that they understand what part of their project needs work and where the immediate priorities lie.

Industry Mentor 1

This course provides a window into the workings of an industry studio. Students respond to constructive critique, provide input on the work of their peers, and modify their activities to achieve final project goals. The focus is on commitment, professionalism, preparedness, and the ability to communicate effectively with Industry Mentors and peers.

Required Courses for Animation Stream

Acting for Animators 1

Students work on one individual assignment designed to build their knowledge and understanding of shot workflow, body mechanics, action analysis (the practice of observation and application), and performance. Students create a foundation of research before beginning the assignment including shooting video reference and creating thumbnail sketches. Emphasis is placed on blocking and posing, before splinting and polishing their shots.

Advanced Animation

In Advanced Animation, students expand their knowledge of the animation principles with advanced levels of application. Students work on multiple in-class exercises designed to build their understanding, proficiency, workflow speed, and critical artistic eye for mechanics of motion, timing, and staging. The mechanics of quadruped motion is also discussed and applied.

Final Project Development 1 - Animation

Final Project Development 1 is the pre-production element for student short films. Final Project Development requires students to finalize their short film stories, create a 3D animatic from a storyboard, model proxy character(s) and/or model final characters, rig using the re-use rig, create face shapes and a facial control panel, and have a final posed animatic that has been approved (for cameras and story line).

Required Courses for Modeling Stream

Advanced Modeling 1

Advanced Modeling 1 gives students a look at modeling through the eyes of a production studio. The course introduces students to scheduling and planning, efficiencies in the modeling process, and working with more complex 3D environment assets. A strong emphasis is put on using more efficient modeling, shading, and render processes. Students develop a realistic view of scheduling build and render time, and how to manage even the most complex 3D scenes in an efficient manner.

Digital Sculpting 1

This course gives students a solid foundation for building character models in ZBrush. With an emphasis on anatomy sculpting, students explore character model proportions and anatomical forms. Students explore essential tools for character generation in Z-Brush, and the process of

refining the anatomy of a model. Students study the process of retopologization and apply it to their own models. This course also looks at the relation of UV's and Z-Brush.

Final Project Development 1 – Modeling

This course gives students the experience of the modeling process from design to production. By the end of the term, students are expected to have completed an environment model. This course consists of a weekly review of modeling stream students' projects, as well as a monthly review based on the original concept development completed, and approved, in Term 3.

Required Courses for Visual Effects Stream

Advanced Compositing 1

This course introduces students to the fundamentals of node-based compositing using Nuke software. In addition to Node Based Compositing, topics include colour correction, keying, tracking, rotoscoping, temporal operations, and rig & marker removal. In this course, students apply key compositing skills to their final visual effects projects.

Advanced Visual Effects 1

Students gain hands-on experience with the techniques and execution of Visual Effects, as pertaining to the film industry, and the workflow and structure of computer graphics to live action plate integration. Exercises that simulate a current industry pipeline include planning, production, and effects production of a complete Visual Effects shot. Students have access to experienced mentorship for discussion and feedback. This course continues to Term 6.

Final Project Development 1 – Visual Effects

Final Project Development 1 is the Pre-Production element for student short films. Final Project Development requires students to finalize their short film stories, create a 3D animatic from a storyboard, produce final, and rigged CG character(s) and/or models. As in the studio environment, students are expected to hit the deadlines set by the Final Project Development schedule. Asset management and approval are guided by the mentor.

Advanced Level

Unit 5

Industry Mentor 2

With the continued support of Industry Mentors, students gain new insights into the components of the production pipeline. Working in the studio, students further expand their awareness of individual creative and technical strengths. They rapidly assimilate input, provide feedback to their peers, and adapt approaches to produce the best possible final project that is aligned with their own specific career goal.

Required Courses for Animation Stream

Acting for Animators 2

In this course, students expand on the principles and theory presented in Advanced Animation and Acting for Animators 1 to create an authentic character dialogue performance. Students work on a single assignment that is designed to build their understanding of action analysis (the practice of observation and application), facial animation techniques, and acting for animation theory. Students create a foundation of research before beginning each assignment including shooting video reference and developing thumbnail sketches. Emphasis is placed on blocking and posing, before splinting and polishing their shots.

Final Project Development 2 – Animation

Students are required to start production of their final projects. Students complete a production schedule that outlines how many seconds per week they are required to animate to finish the majority of their production during the 8 weeks of Term 5. Students plan their strategies taking into account shot difficulty, re-uses, and any changes based on critique that may be required. Students participate in dailies at the start of every lab period, receiving critique and suggestions of their work while learning to make comments of their own in regards to other animators' work. This is a process of improving the animator's ability to gauge what is working or not working in the animated expression of weight, timing, motivation, shot continuity, creative acting choices, line flow, contrast, and staging.

Required Courses for Modeling Stream

Digital Sculpting 2

This course continues with the models started in Digital Sculpting 1. Students take their character proxies and flesh out the details. Various tools and techniques for using Z-Brush to add details, and organize layers for sculpting, are applied. As they refine their character models, students look at posing and sculpting detail in pose, from cloth to subtle muscle deformation.

Advanced Modeling 2

Advanced Modeling 2 covers the creation of production-ready character models. Topics covered include advanced subsurface scatter shading techniques, cloth construction/simulation, and character portrait lighting. The tools and techniques covered allow students to create efficient, photo-realistic characters, and give students the tools to showcase the model artistically and effectively.

Final Project Development 2 – Modeling

By the end of the term, students are expected to have completed a character model. This course consists of a weekly review of modeling stream students' projects, as well as a monthly review based on the original concept development completed, and approved, in Term 3. The weekly reviews are supervised lab periods where student work is reviewed one-to-one with an

instructor in order to improve the overall quality of the work, inspire the student, and keep them on track with their goals and overall objectives.

Required Courses for Visual Effects Stream

Advanced Compositing 2

This course is continuation of study from Term 4. This course introduces students to the fundamentals of node-based compositing using “Nuke” software. In addition to Node Based Compositing topics include Colour Correction, Keying, Tracking, Rotoscoping, Temporal Operations, and Rig & Marker Removal. In this course students apply key compositing skills to their final visual effects projects.

Advanced Visual Effects 2

In this course, students are taught colour space, and how to manipulate and correct colour in photographic plates. By the end of the course, students understand advanced shading and rendering techniques, are able to create advanced, multi-layer composites in a node-based compositing package, can generate particle, explosive and liquid effects, and understand—and are able to write and edit—CG programming scripts.

Final Project Development 2 – Visual Effects

In this course, students are required to start production on their final projects. Students finalize their short film stories; create a first pass integration from a 3D animatic, using final rigged CG character(s) and/or models. As in the studio environment, students are expected to meet the deadlines in the Final Project Development schedule. Asset management and approval are guided by the mentor.

Unit 6

Industry Mentor 3

Students complete tasks, refine work, and produce a professional portfolio to show future employers. With the guidance of Industry Mentors, students expand project management skills and develop a greater understanding of what it takes to complete a major production cycle.

Required Courses for Animation Stream

Final Project Development 3 – Animation

Final Project Development 3 is the post-production element of student short films. As in any post-production work, students in Term 6 tweak and continue to finalize the animation in shots; working on the final lighting and look, as well as the final renders and compositing. Animators are expected to plan carefully and consult with their mentor on the best way to fully actualize their films in the time remaining. This phase of the production is very self-directed. Students should be extremely pro-active in acquiring the feedback they need to improve their quality of

work. Dailies are a major component of the animation process, and shots should be animated with the highest production quality in mind. The mentor can offer final approval for shots.

Required Courses for Modeling Stream

Final Project Development 3 – Modeling

By the end of the term, students are expected to have organized their work, rendered it, cleaned up the settings, and prepared a final cut. Students are also expected to have completed building another model.

This course consists of a weekly review of modeling stream students' projects, as well as a monthly review based on the original concept development completed, and approved, in Term 3. The weekly reviews are supervised lab periods where student work is reviewed one-to-one with an instructor in order to improve the overall quality of the work, inspire the student, and keep them on track with their goals and overall objectives.

Required Courses for Visual Effects Stream

Final Project Development 3 - Visual Effects

This course covers the finishing stages of Production where all elements of student short films are completed. The elements should consist of Props, CG models, and Actors, if required. Final live action plates are acquired and students complete the final Colour Correction. Final Project Development requires students to finalize their short film stories, to turn a loose-timed 3D animatic (Soft Lock), and to finalize the hard-lock of their demo reels. Asset management and approval are guided by the mentor.

eduXtra

Graphic Design

Beginner Level

Unit 1: INTRODUCTION TO GRAPHIC DESIGN

Module 1 offers an overview of what graphic design is and the immense professional opportunities it provides. Students will be inspired and enlightened whilst being taken on a journey to the great works of past and present iconic graphic designers. You will be introduced to the most popular designer sites encompassing work within the various industries that designers work in.

Content of Unit 1

Definition: A definition of graphic design and its specialized industries.

History: The history of written communication from ancient to present times with visual examples of pivotal movements and designer work.

Specialties: Explanation of the various specialties within the industry of graphic design. An understanding of graphic design's role in future industries.

Social Networks: Introduction to professional organizations and affiliations that will enrich the student's understanding of the profession.

Learning outcomes of Unit 1

A definition of graphic design.

An introduction to pivotal historic and contemporary designers.

An introduction to the various specialties included in the graphic design profession.

An introduction to online design resources that will inspire and enrich student's education throughout the Module.

Unit 2: DESIGN BASICS

In this module, students will begin putting design elements and principles into practice. Students will begin to make decisions using the visual language of a designer. By doing simple studies, this module will introduce students to Adobe Illustrator™ software.

Content of Unit 2

Vocabulary: Design elements and principles.

Studies: Illustrated studies reinforcing the concepts and vocabulary of design. Refinement of final studies using Adobe Illustrator™ software.

Software: Introduction to vector-based computer software Adobe Illustrator™.

Learning outcomes of Unit 2

A working knowledge of design elements and how to use them.

A working knowledge of design principles and how to use them.

An introduction to design vocabulary needed to evaluate solutions and communicate as a designer.

Ability to manipulate space to communicate specific objectives.

UNIT 3: INTRODUCTION TO TYPOGRAPHY

Typography is a critical skill to the graphic designer. In Module 3, students will get an overview of what typography is and the integral role it plays in graphic design. They will learn the history and evolution of the alphabet and typographic design and will advance into basic theory and practice.

Content of Unit 3

History: Students will be introduced to the evolution of the alphabet and letter-form design.

Vocabulary: Students will learn type families, type anatomy and type principles.

Studies: Students will learn how to illustrate the basic type families and apply tools to them.

Software: Students will learn typographic tools available in Adobe Illustrator™ software.

Learning outcomes of unit 3

Knowledge of the evolution of the alphabet & letter-forms.

Knowledge of the history of typographic design.

An introduction to typographic vocabulary needed to communicate as a typographic designer.

Ability to classify the different classifications of typography.

Unit 4: COLOUR

In Module 4, students will learn the critical elements and principles of color that create meaningful design. Students will be introduced to the relative theory of color and will learn the vocabulary and tools needed to create and talk about color design.

Content of Unit 4

Vocabulary: Students will learn the vocabulary associated with color theory.

Studies: Students will display a working knowledge of the concepts in this Module by completing several computer based color studies using templates provided.

Software: Students will learn the color tools available in Adobe Illustrator™ software.

Learning outcomes of Unit 4

Acknowledge of different types of color perception.

An understanding of the color vocabulary needed to communicate as a designer.

An introduction to the color theories needed to work with color.

Ability to manipulate color using basic color tools.

Unit 5: ADVANCED TYPOGRAPHY

In Module 5 students will advance their knowledge of typography by learning how to apply graphic design elements and principles to typographic design. All studies in this Module will be computer based.

Content of Unit 5

Vocabulary: Students will learn advanced typographic theory and vocabulary.

Studies: Students will display a working knowledge of the concepts in this Module by completing several computer-based typographic studies using templates provided.

Software: Students will learn advanced typographic tools available in Adobe Illustrator™.

Learning outcomes of Unit 5

An expanded knowledge of type anatomy, tools and vocabulary.

An introduction to the elements, principles and theories of design as they apply to typography.

The ability to create letterforms, lines of type and body copy, using Adobe Illustrator™ software.

Intermediate Level

Unit 6: PHOTOGRAPHY

In Module 6 students will get an overview of photography. They will learn the basic tools they need to shoot photography as a graphic designer, will learn how graphic designer's work with professional photographers and will learn how to source online stock photography. They will be introduced to pixel-based graphic design programme Adobe Photoshop™.

Content of Unit 6

Vocabulary: Students will learn the tools and vocabulary associated with printing and photography.

Studies: Students will display a working knowledge of the concepts in this Module by completing a studio style photo shoot. They will also create their first advert design.

Software: Students will learn basic photo manipulation tools Adobe Photoshop™ software.

Learning outcomes of Unit 6

An understanding of the basic tools for photography.

An understanding of vocabulary, resolution and file formats.

The ability to create impacting photographic compositions.

The ability to crop and manipulate photographs to enhance meaning.

An introduction to layout and advert design.

Unit 7: LOGOTYPE DESIGN

In Module 7, students will use the tools they have learnt to create typographic systems. This is how dynamic logotypes are made. Students will be introduced to the creative process and will learn how to use it to create, analyze and manage concepts. They will also learn how to manipulate letterforms to create legible, well crafted, dynamic and meaningful word-marks.

Content of Unit 7

Process: Students will learn the processes and tools associated needed to create meaningful design concepts.

Studies: Students will display a working knowledge of the concepts in this Module by completing several computer-based typographic projects using templates provided.

Software: Students will use illustration and Adobe Illustrator™ software to illustrate, design and refine projects.

Learning outcomes of Unit 7

An understanding of the creative process.

The ability to generate, analyze, edit and refine concepts.

The development of a dynamic unified mark.

The development of a typographic logotype.

Advanced

UNIT 8: DESIGN SYSTEMS I

Unit 8 is all about systems. Students will begin to show a command for design principles by creating a graphic interpretation of an organic subject. This project reinforces the creative process and the integral part that research plays in concept and design. Students will use illustration and Adobe Illustrator™ software to develop their marks.

Content of Unit 8

Process: Students will follow the creative process to define their own goals for the projects in the Module.

Studies: Students will conceptualize, develop and refine design systems based upon an organic form of their choosing. They will further this knowledge by creating an iconic system.

Software: Students will use advanced Adobe Illustrator™ software knowledge to illustrate, design & refine projects.

Learning outcomes of Unit 8

The ability to create, identify and refine advanced design systems.

The ability to evaluate design decisions to enhance communication and simplify graphic systems.

The development of a dynamic unified organic form.

The development of a unified series of icons.

Working with the Adobe Illustrator™ tools in a more advanced way.

Unit 9: LAYOUT DESIGN

In Module 9, students will learn the essential elements of composition and layout design. Students will create dynamic typographic compositions in multi-page layout programme, Adobe InDesign.

Content of Unit 9

Vocabulary: Students will reinforce vocabulary from earlier modules that applies to typographic layout.

Studies: Students will learn how to manipulate typographic principles to create dynamic layout design.

Software: Students will be introduced to Adobe InDesign™.

Learning outcomes of Unit 9

Advanced understanding of proportion and its application in layout design.

The ability to create unified systems out of dissimilar elements.

The ability to manipulate typographic tools to create dynamic layout.

The development of a type and image project.

An introduction to multi-page layout planning, design and software.

The development of advanced typographic layout.

The development of a multi-page magazine layout.

MODULE 10: DESIGN SYSTEMS II

In Module 10, students will begin to make their own decisions to create professional quality, self-guided work.

Students will now have a good knowledge Adobe Illustrator™, Photoshop™ and InDesign™. They will know the strengths and weaknesses of each graphic design programme. They will also have the ability to brainstorm and create their own design and communication goals for their projects. This Module will allow students to analyze previous work and rework it into real-world projects for their first graphic design portfolio.

Content of Unit 10

Projects: An instrumental module in the course. Students will deepen their knowledge of working with the design brief and idea generation. Design a complex corporate identity system, package design project and design campaign.

Software: Students will identify which programmes are right for each design task by using Photoshop™, InDesign™ and/or I for their projects.

Learning outcomes of Unit 10

The ability to define project goals.

The ability to create a complex working design brief.

The ability to critique, analyze and develop professional quality design.

The development of Corporate Identity systems, packaging and design campaign.

UNIT 11: PREPARING YOUR PORTFOLIO

Module 11 will teach students the importance of marketing themselves and their work. Students will begin to refine their professional portfolio; design a personal identity system, learn basic professional practices and how to further their design education.

Content of Unit 11

Resources: Students will be introduced to various graphic design job resources.

Studies: Students will learn how to design a personal identity system, and create a professional graphic design portfolio with a design system in place.

Software: Students will use the appropriate software for the projects.

Learning outcomes of Unit 11

- An introduction to career opportunities in graphic design.
- The ability to create and design a personal identity system.
- The ability to develop a healthy professional practice.
- The ability to create a design system and impactful portfolio.

