



PERIYAR UNIVERSITY
Periyar Palkalai Nagar, Salem-636011
(Reaccredited with 'A' Grade by the NAAC)



SCHOOL OF MATHEMATICS

Department of Computer Science



B. Voc. Augmented Reality/ Virtual Reality
[Alignment with NSDC/NSQF/DGET]

REGULATIONS AND CURRICULAR FRAMEWORK

(Effective from the academic year 2019-2020 and thereafter)

B. Voc. AR/VR (Augmented Reality/ Virtual Reality)

REGULATIONS (2019-20 onwards)

Preamble

The Department of Computer Science aims in serving the students, employed and budding entrepreneurs through creative paths that enrich and empower their academic and professional passions expanding our collective contributions to the world. Augmented and Virtual Reality is an interdisciplinary programme.

The department was sanctioned permission to offer B. Voc. AR/VR programme from the academic year 2019 -20.

Programme Objectives of B. Voc. AR/VR is

- To provide an environment in which Students, Employed and budding Entrepreneurs can observe, learn, persevere and transmit the knowledge, acumen and principle that will help ensure the survival of this and future generations and improve the quality of life for all.
- To develop an understanding and appreciation for the corporeal and cultural worlds in which they live and to realize their utmost latent of intellectual, physical and human development.
- Designed as an Empowerment Vocational Degree / Advanced Diploma / Diploma program for those who think big and are willing to take on newer horizons of unprecedented challenges.
- To provide a technology to combine the virtual world and real world by overlaying the digital interactive content through holographic images to interface end user.

Eligibility for admission

Those who have passed +2 examinations in any stream approved by TNBSC/CBSE/ICSE or any Diploma/UG degree, approved by the Association of Indian Universities are eligible to seek admission. Vocational stream students are most preferred.

Duration - Three years (120 days per semester includes 30 days of Apprenticeship)

S. No	Exit Program Level	Duration
1	Certificate in AR/VR – Graphic Design	6 Months
2	Diploma in AR/VR – 2D Animation	12 Months
3	Advanced Diploma in AR/VR	24 Months
4	B. Voc. in AR/VR	36 Months

National Skill Qualification Framework Level (NSQF):

NSQF Level	Skill Component Credits	General Education Credits	Total credits for Award	Normal Duration	Exit Points/Awards
4	18	12	30	One Semester	Certificate
5	36	24	60	Two Semester	Diploma
6	72	48	120	Four Semester	Advanced Diploma
7	108	72	180	Six Semester	B. Voc. Degree

- Credit refers to a unit by which the course work is measured. It determines the number of hours of instructions required per week.
- **One credit** is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week. Accordingly, one Credit would mean equivalent of 14-15 periods of 60 minutes each or 28 – 30 hrs of workshops / labs.
- For **internship/field work**, the credit weightage for equivalent hours shall be 50% of that for lectures / tutorials.
- For **self-learning**, based on e-content or otherwise, the credit weightage for equivalent hours of study shall be 50% of that for lectures / tutorials.

Teaching methodologies

The **classroom teaching** would be through conventional lectures, video presentations and use of OHP and Power point presentations. The lecture would be such that the students should participate actively in the discussion, student’s seminar and multi sensory approach in learning. The scientific discussions would be arranged to improve their communicative skills.

In the laboratory, instructions would be given for the experiments followed by demonstration and finally the students have to do the experiments individually. Periodic tests would be conducted and for the students of slow learners would be given special attention.

Along with Lectures, Tutorials and Laboratory sessions, through **Self learning** (Flipped Class room pedagogy) the student will be given

- **PBL (Project based learning)** – Learning through Gamification
- **Webinars** by Industry Experts on specific job roles
- **Apprenticeship** in the industry on the job roles trained with the support of **MESC (Media and Entertainment Skill Council) / NASSCOM** and Industry
- **Industrial Visit - Schematic work process** on the job roles trained in each semester (as mentioned later in the structure of the programme) will facilitate skills and professional career in the same field.

Level Descriptors: The curriculum is designed in a manner that at the end of semester-1, year-1, year-2 and year-3, students are able to meet below mentioned level descriptors for level 4, 5, 6 and 7 of NSQF respectively.

Level	Semester	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level- 4	1	Digital Technic - 1(Practical)	Design Process	Digital Technic - 2(Practical)	Visual Design - 1	Digital Technic - 1 and 2 (Practical)
Level- 5	1	Digital Technic - 1(Practical)	Design Process	Digital Technic - 2(Practical)	Visual Design - 1	Digital Technic - 1 and 2 (Practical)
	2	Digital Technic - 3(Practical)	Python	Digital Technic - 4(Practical)	UI / Animation Design	Digital Technic - 3 and 4 (Practical)
Level- 6	3	Digital Technic - 5 and 6 (Practical)	3D Design	Digital Technic - 5 and 6 (Practical)	Visual Design – 2/ GE-Communication	Digital Technic - 5 and 6 (Practical)
	4	Advanced 3D and Match moving techniq		Communication design	Digital Technic - 7 and 8(Practical)	Digital Technic - 7 and 8(Practical)
Level- 7	5	VR Design	Introduction to VR	Digital Technic - 9(Practical)	Intro to Programming	Digital Technic - 9(Practical)
	6		Mobile AR / VR	Interactive Narrative	Introduction to AR	Project

Examinations

Examinations are conducted in semester pattern. Candidates failing in any subject (both General Education and Skill Component) will be permitted to appear for such failed subjects in the same syllabus structure at subsequent examinations for within next 5 years. Failing which, the candidate has to complete the course in the present existing syllabus structure.

Scheme for Evaluation

Evaluation will be done both on a continuous basis and at the end of the semester. The first evaluation will be in the 4th week, the second in the 8th week, third in the 12th week, fourth in the 18th week and the end – semester examination in the 20th week. The General Education Component is assessed by the University and Skill Education Component by the University and SSCs.

Grading System

Evaluation of performance of students is based on ten-point scale grading system as given below.

Ten Point Scale			
Grade of Marks	Grade points	Letter Grade	Description
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Equivalence of the Programme

Candidates who have completed B. Voc. AR/VR are equivalent to graduates specialising in AR and VR and in B.Sc. CS/BCA or all its related disciplines awarded by any UGC recognized Universities and Institutions.

SSC - NOS – QP Mapping:

Year	SEMESTER	Exit / Job Profile	MESC QP
1	1	Certificate in AR VR design - Graphics Designer	MESQ0601
	2	Diploma in AR VR design - 2D animation	MESQ0701
2	3	No Exit Option	MESQ3002
	4	Advanced diploma in AR VR design	
3	5	No Exit Option	MESQ0508
	6	B.Voc in AR/VR (AR Developer / VR Developer)	MESQ0509 MESQ0510

CBCS- STRUCTURE OF THE PROGRAMME: The programme structure comprises of two components.

Course Component	No. of Courses	Hours of learning	Marks	Credits
General Education Component				
Language I – Tamil/Hindi/Malayalam	02	90	200	06
Language II – English	02	90	200	06
Elective Courses	04	248	400	16
Value Education courses	02	15	200	02
General education	10	525	1000	42
Total	20	968	2000	72
Skill Component				
Skill Component	20	1620	2000	90
Apprenticeship	06	150	600	16
Project	01	68	100	02
Total	27	1838	2700	108



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Curriculum Framework of B. Voc. AR/VR Programme

Part	Course Code	Course	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER – I											
GENERAL EDUCATION COMPONENT											
I	19BARVRG01	Design Process	3	-	2	5	-	60	25	75	100
II	19BARVRL01/ 19BARVRH01/ 19BARVRM01	Lang 1 - Tamil / Hindi - I/ Malayalam- I	3	-	-	3	-	45	25	75	100
III	19BARVRE01	Lang 2 - English - I	3	-	-	3	-	45	25	75	100
IV	19BARVRV01	Value Education 1 - Yoga	-	-	1	1	-	8	25	75	100
SKILL COMPONENT											
V	19BARVRS01	Digital Design Lab	-	1	1	-	2	38	40	60	100
VI	19BARVRS02	Visual Design	3	1	2	-	6	90	40	60	100
VII	19BARVRS03	Image Editing Lab	-	2	2	-	4	75	40	60	100
VIII	19BARVRS04	Digital Illustration Lab	-	2	2	-	4	75	40	60	100
	19BARVRA01	Apprenticeship / Industry Visit	-	-	2	-	2	15	20	30	50
		Total				12	18	451	280	570	850

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Part	Subject Code	Subject Name	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER – II											
GENERAL EDUCATION COMPONENT											
I	19BARVRG02	Python Programming	3	-	-	3	-	45	25	75	100
II	19BARVRG03	Python Programming Lab	-	1	-	1	-	30	40	60	100
III	19BARVRL02/ 19BARVRH02/ 19BARVRM02	Lang 1 - Tamil -II/ Hindi - II / Malayalam- II	3	-	-	3	-	45	25	75	100
IV	19BARVRE02	Lang 2 - English - II	3	-	-	3	-	45	25	75	100
V	19BARVRV02	Value Education 2 - Environmental Studies	-	-	2	2	-	15	25	75	100
SKILL COMPONENT											
VI	19BARVRS05	Animation Design Theory	3	-	2	-	5	60	25	75	100
VII	19BARVRS06	UI Design Theory	3	-	2	-	5	60	25	75	100
VIII	19BARVRS07	UI Design Lab	-	2	-	-	2	60	40	60	100
IX	19BARVRS08	2D animation Lab	-	2	2	-	4	75	40	60	100
X		Online Course	-	-	1	-	1	8	-	-	-
XI	19BARVRA02	Apprenticeship / Industry Visit			1		1	8	20	30	50
		Total				12	18	451	290	660	950

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Part	Course Code	Course	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER – III											
GENERAL EDUCATION											
I	19BARVRG04	3D design	2	-	1	3	-	38	25	75	100
II	19BARVRG05	Data Structures and Algorithm	2	-	1	3	-	38	25	75	100
III	19BARVRG06	Algorithms Lab	-	1	2	3	-	46	40	60	100
IV	19BARVRG07	Unity Game design	2	-	1	3	-	38	25	75	100
V	19BARVRE01	Elective - 1									
SKILL COMPONENT											
VI	19BARVRS09	Model Making techniques	-	2	3	-	5	84	40	60	100
VII	19BARVRS10	Modelling & Texturing Lab	-	3	3	-	6	114	40	60	100
VIII	19BARVRS11	Arch Viz Lab	-	2	3	-	5	84	40	60	100
	19BARVRA03	Apprenticeship / Industry Visit			2	-	2	16	20	30	50
		Total				12	18	458	255	495	750

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Part	Course Code	Course	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER – IV											
GENERAL EDUCATION COMPONENT											
I	19BARVRG08	Java Programming	3	-	3	6	0	69	25	75	100
II	19BARVRG09	Java Programming Lab	2	1	3	6	0	84	25	75	100
III	19BARVRE02	Elective - 2									
SKILL COMPONENT											
III	19BARVRS12	Advanced 3D modelling technique Digital Sculpting technique	1	2	2	-	5	90	40	60	100
IV	19BARVRS13	Digital Marketing Techniques	2	2	2	-	6	105	40	60	100
VI	19BARVRS14	360 Video Editing	1	2	2	-	5	90	40	60	100
	19BARVRA04	Apprenticeship / Industry Visit	-	-	2	-	2	15	20	30	50
		Total				12	18	453	190	360	550

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Part	Course Code	Course	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER - V											
		GENERAL EDUCATION									
I	19BARVRG10	C# Programming	3	-	2	5	-	61	25	75	100
II	19BARVRG11	C# Programming Lab	-	2	-	3	-	60	25	75	100
III	19BARVRE03	Elective - 3	3	-	1	4	-	53	25	75	100
		SKILL COMPONENT									
IV	19BARVRS15	Digital lighting Techniques		1	2	-	3	45	40	60	100
V	19BARVRS16	Virtual Reality Lab		2	3	-	5	82.5	40	60	100
VI	19BARVRS17	Augmented Reality Lab		2	3	-	5	82.5	40	60	100
VII	19BARVRS18	Design Patterns for real time Programming		1	2	-	3	45	40	60	100
	19BARVRS19	Mobile VR Development									
	19BARVRA05	Apprenticeship / Industry Visit			2	-	2	15	20	30	50
		Total				12	18	444	255	495	750

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Part	Course Code	Course	CREDIT			Total Credit		Hours	Marks		
			L/T	P	S	General	Skill		IA	EA	Total
SEMESTER - VI											
GENERAL EDUCATION COMPONENT											
I	19BARVREL04	Elective - 4	4		2	6	-	75	25	75	100
	19BARVREL05	Elective - 5	4		2	6	-	75	25	75	100
SKILL COMPONENT											
IV	19BARVRP01	Project	6	6	6	-	18	318	25	75	100
		Total				12	18	468	75	225	300

L – Lecture, T – Tutorial, P – Practical, S - Self Learning, IA – Internal Assessment, EA - External Assessment

Scheme for Internal Marks in Theory (Max. marks-25)

Test	:	10 Marks (Best one out of 2 Internal Tests– 5 marks, Model test – 5 marks)
Seminar, Activity, ICT Application, Case Studies and Assignment	:	10 Marks
Attendance	:	05 Marks
Total	:	25 Marks

Evaluation of External Examinations Question Paper Pattern

Time duration: 3 Hours

Max. Marks: 75

PART- A: $20 \times 1 = 20$

Answer all the questions

(Objective type four questions from each unit)

PART- B: $3 \times 5 = 15$

Answer any three questions out of five questions

(Questions must be of type analytical)

PART- C: $5 \times 8 = 40$

Answer all the questions

(Either or type for each unit)

Scheme for Internal Marks in Practical (Max. marks-40)

Performance Assessment in Practical Class	:	15 Marks
Model Test (Best one of two tests)	:	10 Marks
Attendance	:	05 Marks
Timely submission of Record	:	10 Marks
Total	:	40 Marks

Evaluation of External Examinations

Time duration: 3 Hours

Max. Marks: 60

Question Paper Pattern

1. One compulsory question from the given list of objectives : 30 Marks
2. One Either/OR type question from the given list of objectives : 30 Marks

Distribution of Marks

Problem Understanding	:	05 Marks
Program writing	:	10 Marks
Debugging	:	10 Marks
For Correct Results	:	05 Marks

B. Voc. AR/VR – SYLLABUS

SEMESTER-I

COURSE-19BARVRG01

Credits: 2

DESIGN PROCESS

Course Objectives:

This course enables the students:

- **To recognize the basic principles of design process**
- **Explore different approaches in computer animation**
- **To understand the elements of design and typography design**

UNIT I - Introduction to Design

What is design – design process – History of design-Role of design in society -Impact of design – function of design-Principles of design-Emphasis – balance and alignment – contrast – repetition – proportion – movement – white space -Rules for making good design- Concept – communicate – visual voice – space – symmetry – typeface-Graphic Design Process-Design brief – research – sketch concepts – evolve and iterate

UNIT II - History of Animation

Earlier animation – traditional animation – stop motion animation - CG animation Animation: Meaning, definition & types what is animation – motion graphics – 2D animation – 3D animation Basic Principles of Animation- 12 basic principles of animation Anatomy & Body Language- Human anatomy - animals anatomy – gestures – expressions Introduction to Animation Technologies keyframing – procedural - behavioral

UNIT III - Human Computer Interaction

Principles – methodologies - Design Analysis Design concept – experimentation – simulation prototyping – decision making Principle of effective design- Composition and focal points – eye path – balance – color – movement Strategies for good design Targets and metrics – positioning – Insight User Control Consistency and standards – flexibility - Aesthetic and minimalist design

UNIT IV - Elements of Design

Line – Color – shape – space – texture Color Wheel color harmony- color context Lighting and Shading light source – gradients – highlights – shadows Visual and Imagery Techniques direct gaze – color- simplicity – association Direct & Indirect Approach - Thinking in various point of view

UNIT V - History of Typography

Ancient era – middle ages – modern typography Expressive- Typography design of the typeface – creative arrangement of letters- Choosing a Typeface demographics – legibility – print, web or other media -Family classification of type serif – sans serif – script - decorative Type Design & Anatomy strokes – terminals – space – proportions- Introduction to images and resolution Types of images – User interface – images resolutions

Course Outcomes:

On the successful completion of the course, students will

- Familiarize the basics principles of design process
- Understand and apply various aspects of computer animation
- Mastering the design elements and typography design

Reference Books:

1. Robert Curedale, “Design Thinking Process & Methods” 5th Edition, 2019
2. Paul McNeil, “The Visual History of Type: A visual survey of 320 typefaces”,2017
3. Karl Aspelund, “The Design Process” 3rd Edition, 2014
4. Poppy Evans, Mark A. Thomas, “Exploring the Elements of Design”, 3rd Edition, Cengage Learning, 2012.

DIGITAL DESIGN LAB

Course Objectives:

This course enables the students:

- To learn and understand the basics of digital electronics
- To design basic logic, combinational and sequential circuits
- To create a visual-verbal connection between the content and the image using traditional and/or digital media

Implement the following in Digital Design:

1. Create posters using principles like Positive & Negative space, Emphasis, Repetition and contrast
2. Design Icons for the given concepts
3. Color the given Images with Mono chromatic colors scheme
4. Color the given Image with triadic colors scheme
5. Color the given Image with minimalistic colors scheme
6. Shade the given image as per instructions
7. Paint textures as per given instruction
8. Design posters with Dots and lines for the given themes
9. Create patterns for gift wrapping paper
10. Create Expressive poster using text for the given concepts

Course Outcomes:

On the successful completion of the course, students will,

- Construct, analyze, and troubleshoot simple combinational and sequential circuits
- Develop the ability to design and troubleshoot a simple state machine

VISUAL DESIGN

Course Objectives:

This course enables the students:

- To develop creativity in advertising
- To understand the basics of typography, grids in layout design, color modes
- To conceive the design concepts of Virtual Reality

UNIT I - Types of advertising

Broadcast media - print media – social media - Basic elements of visual design Lines – Shapes – Color palette – Texture – Typography – Form Principles of visual design Unity – Gestalt – Hierarchy – Balance – Contrast – Scale – Dominance Creating - Headlines and Body content Headlines - subhead – body copy Pre-press technology and Post-press technology-What is prepress – Prepress processes – Press – Post press technology

UNIT II - Grids in layout design

Anatomy of a grid - Manuscript Grid - Column Grid - Modular Grid - Baseline Grid - Hierarchical Grids - Types of layout design Consumer – Corporate – Retail - Mixed design - Design process- Creative brief – Research and brainstorm – Sketching – Refining – resenting – Revisions – Final delivery Brand Management -What is brand – Brand identity design - Design thinking process - Empathize – Define -Ideate – Prototype - Test

UNIT III - Designing for VR

Visual aid – UI depth and eye strain – Constant velocity – Maintaining head tracking – Guiding with light – Leveraging scale – Spatial audio – Gaze cues Image Size and resolution Pixel density – Eye buffers – Optimal resolution- Creating panoramic images-Taking panoramas – HDRI image - Editing

UNIT IV - Color Modes

What are the color modes – Changing color mode Type tool options - Point type – Paragraph type – Work path from type – Convert between point type and paragraph type- Layers- Layers panel – Types of layers – Features of layers Shape tools and Painting Tools -Shape tools and modes - Brush tools – History brush tools – Gradient tools – Effects - Effects panel – Graphics panel – Photo effects

UNIT V - Filter Gallery

Filter gallery – Applying filters – Smart filters – Channels - Channels panel – Edit channels – Channel as selection – Creating a new channel - Deleting a channel - Actions - Actions panel – Recording actions – Recording path – Insert a stop – Change settings – Exclude commands – Inserting a non-recordable menu command – Edit and rerecord actions – Batch command - Rollovers - Creating buttons – Make layer duplicates – Create rollover states 360-degree illustrations for VR - One point and equirectangular perspective – Spherical Panorama – Planning and drawing 360-degree illustration – Exporting for VR

Course Outcomes:

On the successful completion of the course, students will

- Be able to work with typography and grids in layout design
- Efficiently use various color modes
- Have the ability to record an action and create rollover states

Reference Books:

1. Karl Aspelund , “The Design Process”, 3rd Edition, 2014
2. Brian Wood, “Adobe Illustrator CC Classroom”, 1st Edition, 2019
3. Joseph A. Gatto, “Exploring Visual Design: The Elements and Principles”, 2010

IMAGE EDITING LAB

Course Objectives:

This course enables the students:

- To develop expertise in image editing operations and related techniques
- To create an image and perform various image processing operations

Implement the following in Image Editing:

1. Turn day image into a night image
2. Retouch the given image
3. Draw an apple with shading
4. Blur the Background apart of subject for the given image
5. Design a logo or Mascot for the given brand
6. Design a flag
7. Create a movie poster with the given genre
8. Create an image that depict literal interpretations (ex. Honeymoon – a moon made of honey)
9. Draw a candle with shadows and smoke
10. Mix up body parts creatively

Course Outcomes:

On the successful completion of the course, students will

- Understand and utilize the language and terms used in fine art, illustration, animation, graphic arts, and photography
- Develop expertise in life-drawing
- Have the ability to produce a well-designed layout and brochure

DIGITAL ILLUSTRATION LAB

Course Objectives:

This course enables the students:

- Develop specialized drawing skills that can be applied in the fields of illustration and graphic design
- Create a visual-verbal connection between the content and the image using traditional and/or digital media

Implement the following in Digital Illustration:

1. Create a simple cartoonic airplane with colors
2. Create a simple cartoon character with cool colors
3. Create a glass jar and color it with shadows
4. Design a Logo
5. Design a Business card
6. Design any of the 5 vegetables that you like
7. Design any 5 flat icons with colors
8. Design a Male and Female human logo
9. Design a pattern and color it with warm colors
10. Create a text and make it as a 3d text using colors and shadows

Course Outcomes:

On the successful completion of the course, students will

- Become proficient in the features of Adobe Illustrator and Photoshop
- Have the ability to create a well-designed layout, brochure or other design materials for print or web

SEMESTER-II

COURSE-19BARVRG02

Credits: 3

PYTHON PROGRAMING

Course Objectives:

This course enables the students:

- To understand the basic concepts of object oriented programming and core python scripting elements
- To be familiar with graphics and image processing concepts
- To perform complexity analysis on searching and sorting algorithms

Unit I

Introduction-Fundamental ideas of Computer Science - The Software Development Process - Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions - Definite iteration: the for Loop - selection: if and if-else statements - Conditional iteration: the while Loop.

Unit II

Accessing Characters and substrings in strings- Data encryption-Strings and Number systems-String methods -Text Files- Lists - Defining simple Functions – Dictionaries

Unit III

Functions - A Quick review - Design with recursive Functions - Managing a Program's namespace - Getting inside Objects and Classes - Structuring Classes with Inheritance and Polymorphism

Unit IV

Simple graphics - Image Processing - The behavior of terminal-based Programs and GUI-based Programs - Coding simple GUI-based Programs - Windows and Window Components - Command buttons and responding to events

Unit V

Measuring the efficiency of Algorithms - Complexity Analysis - Search Algorithms - Search for a minimum - Sequential search of a List - Basic sort Algorithms - Selection sort - Bubble sort - Insertion sort

Text Book:

1. K.A. Lambert, “ Fundamentals of Python: first programs”, Second Edition, Cengage Learning, 2018

Reference Books:

1. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, 2016
2. M. L. Hetland, “Beginning Python: from novice to professional”, Third Edition, Apress, 2017

Course Outcomes:

On the successful completion of the course, students will

- Develop a basic understanding of object oriented programming concepts with python
- Discover how to work with strings, functions and image
- Assess the efficiency of algorithms

PYTHON PROGRAMING LAB

Course Objectives:

This course enables the students:

- To master the fundamentals of writing python scripts
- To perform various image processing operations
- To develop searching, sorting, clustering and classification algorithms with the aid of python standard libraries

Implement the following in Python:

1. Program to Create a Class which Performs Basic Calculator Operations.
2. Program to perform Inheritance.
3. Program to read and count the Occurrences of a Word in a Text File.
4. Program to perform Binary Search.
5. Program to perform Selection Sort.
6. Program to perform different Morphological operations.
7. Program to perform different Edge Detection methods.
8. Program to find objects in an image using Template Matching.
9. Program to perform classification using K-NN algorithm.
10. Program to perform clustering using K-Means algorithm.

Course Outcomes:

On the successful completion of the course, students will

- Develop the basic programming skills in python
- Perform various image processing, searching and sorting operations
- Be able to implement clustering and classification tasks

ANIMATION DESIGN THEORY

Course Objectives:

This course enables the students:

- To understand the fundamental principles and tools of animation and media
- To develop the skills in 2D production, motion graphics, stop motion and basic traditional animation
- To identify the components needed to create interactivity

UNIT I

Introduction to 2D Animation - Traditional animation – Computer animation - Basic concepts of 2D techniques – Principles of motion study - 2D Workflow Script – Storyboard – Concept art – Animation-Introduction to workspace - Understanding document types – Setting up projects and changing project types - Introduction to panels - Properties panel – Tools panel - Working with timeline - Understanding the timeline – Organizing layers in timeline

UNIT II

Strokes and fills - Gradient fill – Adjust stroke and fill color – Transform gradient and bitmap fills – Lock a gradient or bitmap to fill the stage - Creating lines and Shapes - Line segment tool – Rectangles and ovals – Polygons and stars – Object drawing mode – Pencil tool – Brush tool – Brush library - Drawing curves - Pen tool drawing states – Curves with pen tool – Add, delete and adjust anchor points – Adjusting segments - Arranging objects - Stack objects – Align objects – Group objects - Exporting art - Images export - Export animated GIF – Export to library

UNIT III

Working with timeline - Understanding the timeline – Organizing layers in timeline - Working with libraries - Search library items – Copy, edit, rename and delete a library item – Copy library assets between documents – Symbols - Types of symbols – Creating symbols – Convert animation on the stage into a movie clip symbol – Duplicate symbols – Edit symbols – Instances - Creating instance of a symbol – Editing properties – Swap one instance for another – Change an instance type - Graphic filters - Filters overview – Animated filters – Working with filters

UNIT IV

Basic 2D Animation - Animating transformation – Changing the pacing and timing – Animating transparency - Motion path - Editing shape of a motion path with selection and sub selection tools – changing location of a motion path on the stage – Editing motion path with free transform tool - Nested Animations - What is nested animations – Creating nested animations with symbols - Changing pacing and timing - Changing animation duration – Adding frames – Moving keyframes - Motion tween animations - Tween span – Property keyframe – Tweenable objects and properties

UNIT V

Frame by Frame animation - Creating frame by frame animation – Converting classic motion tweens – Using onion skinning - Shape tweens - Creating shape tweens – Control with shape hints – Shape tweening with variable width - Mask layer - Creating mask layer – Mask additional layers – Unlink layers – Animating shape on a mask layer – Animating a movie clip on a mask layer - Motion Editor - Motion editor panel – Property curves – Applying presets and custom eases – Resultant curve – Exporting - Exporting the final output – Different file formats

Course Outcomes:

On the successful completion of the course, students will

- Create animated sequences from the development of the original concept through design to final film or video production
- Coordinate and manage the production of a student film, including the aspects of cinematography, art direction and editing.

Reference Books:

1. Williams, Richard , “The Animator's Survival Kit: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Internet Animators”, 4th Edition, Macmillan , 2009
2. Jean Ann Wright, “Animation Writing and Development: From Script Development to Pitch (Focal Press Visual Effects and Animation)” 1st Edition, Taylor & Francis, 2013.
3. Preston J. Blair, “Animation 1: Learn to Animate Cartoons Step by Step”, 2003
4. Russell Chun, “Adobe Animate CC Classroom in a Book (2018 release), 1st Edition, Adobe Press, 2018

USER INTERFACE DESIGN THEORY

Course Objectives:

This course enables the students:

- To recognize the fundamental user interface design principles and methodologies such as layout, controls and navigation
- To learn the tools and techniques of Photoshop and Illustrator in order to create user interface animations
- To develop a responsive mockup website and mobile with advanced features

UNIT-I

Introduction to Photoshop - Raster graphics - Performance Optimization - Color Calibration
Workspace overview - Photoshop controls - Interface – Layers and Panels – Navigation Pan -
Rotate View tool - Navigator panel - Zoom in or out - Fit an image to the screen- Photoshop
Tools - Selection tools gallery - Crop and slice tools gallery - Retouching tools gallery -
Painting tools gallery - Drawing and type tools gallery – Navigation -notes - measuring tools
gallery - Usability features - Masks in UI Design - Lights and Shadows - Emphasis and
Blending

UNIT-II

Color Scheme - Primary Color - Number of Colors – Secondary colors – Neutral colors –
Brainstorm - Typography - Web Safe Fonts - Font Themes – Size – Color and Contrast –
Tracking – Leading - Soft Buttons - Soft Buttons- 3D Buttons - Realistic Buttons - Button
size - Making it look like clickable – Easy to find and predict – Do not make the user guess
Web Template Design - Components of a Web Page - Header - Navigation - Menus - Form
Elements

UNIT-III

Logo Design Principles - Purpose – Target audience – Planning essentials - Balance - Form –
Aesthetic Unity – Recognizability - Web Layout Design - Grid – Emphasis – Balance – Rule
of third – Rule of odds – Target audience - Poster Design Principles - Readability - Hierarchy
- Pattern – Rhythm – Space – Emphasis – Movement – Unity - Web Layout Design - Purpose
– Simplicity – Navigation – F shaped pattern – Visual Hierarchy -Content – Grid based
Layout – Load time – User friendly - Photoshop Etiquette - Naming – File structure – Mask

once – Save Paths – Stretching text and images – Snap – Apply effects – Collect unused styles and images – Proofread – Make easy to find

UNIT-IV

UI Illustrations - What are illustrations? – Ways to use Illustrations in UI – Reasons to Add Illustrations to UI – Creating visual triggers – Providing support to the copy – Creative storytelling – Emotional appeal – Aesthetic satisfaction - Mobile GUI Design - Decluttering – Offload Task – Breaking the task – Using Screens – Minimized User Input - Mobile GUI Guidelines - Platform – Customer Benefit – Focused devices – Scalability – Screen Transition – Call to action – Empty states – Crates – Action Sheets – Cards or Tiles – Dialogue – Font – Toggles - Android UI Design - Screen Components – Measurements - Screen density – Optimizing Layout - IOS UI Design - Animations - Basics of Animations - Animated Icons - UI Animations in Photoshop - UI Animation in Illustrator.

UNIT-V

Mockup Design - Website/Mobile Mockup – Need for website/mobile Mockup -How to make a mockup website? – steps to consider for mockup website – Mistakes to avoid - Responsive Web Design - Setting the stage – Basic mechanics – Typography and Layout – Navigation patterns – Advanced Enhancement -Performance - Page Designs - One-page Design - Single Page Design - Metro UI Design – Mascot Design - Characters Purpose – Unique features – associated colors – Personality – Exporting - Exporting for Web, Mobile, Print - Design Optimization

Course Outcomes:

On the successful completion of the course, students will

- Gain insight into the basic theories and current research topics in user-centred interaction design
- Be able to create user interface animations with the aid of Photoshop and Illustrator
- Have the ability to develop an interactive mockup website and mobile with the design ideas in a constructive manner

Reference Books:

1. Diana MacDonald, “Practical UI Patterns for Design Systems: Fast-Track Interaction Design for a Seamless User Experience”, Apress, 2019.
2. Jenifer Tidwell, “Designing Interfaces: Patterns for Effective Interaction Design” Second Edition, O'Reilly Media, Inc., 2010.

3. R. Moore “UI design with Adobe Illustrator”, Berkely, California: Adobe Press, 2013.
4. Lesa Snider, “Photoshop CS6: The Missing Manual”, 2nd Edition, O'Reilly Media Publisher, 2012

USER INTERFACE DESIGN LAB

Course Objectives:

This course enables the students:

- To design user interfaces that utilizes the latest technologies in mobile design patterns
- To create solutions for suggested user tasks, applying knowledge gained through the observation of several categories of design patterns used in contemporary apps and websites

Implement the following in UID:

1. Design a UI for a Game website
2. Design a UI for a female centric website
3. Design a UI suitable for both mobile and PC
4. Design a UI for a horror themed website
5. Design a one pager UI for a website
6. Design a one pager UI for a mobile
7. Design a mascot for an imaginary brand
8. Design a UI compatible for IOS
9. Design a mock-up website for a service sector company
10. Design a mobile (Android and IOS) mock-up website for an online store

Course Outcomes:

On the successful completion of the course, students will

- Develop the ability to construct Navigation that enables users to easily accomplish user interface design tasks
- Learn industry-standard methods for how to approach the design of a user interface, key theories and frameworks that underlie the design of most interfaces used in the current scenario

2D ANIMATION LAB

Course Objectives:

This course enables the students:

- To conceive various aspects of animation technology using a variety of two dimensional software
- To develop competencies and skills needed for becoming an effective Animator
- To develop concepts, storyboarding and production of several two dimensional animations

Implement the following in ADT:

1. Ball bouncing across the screen
2. Character jumping
3. Walk cycle
4. Run cycle
5. Flour sack jumping
6. Kicking a ball
7. Character thinking
8. Variations for face expressions
9. Change a character emotion (Happy to sad, sad to angry etc.,)
10. Object falling into a body of water

Course Outcomes:

On the successful completion of the course, students will

- To develop storyboards and two dimensional animations including creating, importing and sequencing media elements to produce multi-media presentations
- Handle animation projects from its conceptual stage to the end product creation