Annexure 16.3

Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Department of Information Technology

&

Center for Machine Learning and Intelligence

B.Sc. Augmented Reality and Virtual Reality

Programme Outcomes

The Graduates will be able to

1. Attain and apply fundamental knowledge in basic concepts of Science
2. Gain Competence to communicate effectively
3. Develop critical thinking for innovations
4. Identify problems and suggest appropriate scientific, technological and environmental solutions.
5. Function individually or as a team in work environment
6. Acquire research skills to inquire, synthesize and articulate solution for community development.
7. Create and apply ICT tools for learning and technology development
8. Exhibit professional ethics and norms for social development
9. Implement acquired knowledge in basic sciences for self directed and lifelong learning
10. Promote entrepreneurial skills

Programme Specific Outcomes

1. Acquire strong programming skills in relevant languages and frameworks for creating AR and VR applications, and be able to troubleshoot & optimize code.

2. Aware of the ethical and legal issues surrounding AR and VR, including privacy, data security, content ownership, and potential societal impacts.

3. Equipped with the knowledge and skills to pursue higher education, assess market opportunities, develop business plans, and potentially start their own AR and VR-related ventures.

Scheme of Instruction & Examinations
(for students admitted from 2024-2025 & onwards)

Part	Subject Code	Name of paper / Component	Hours of instruction/ week		Scheme Examination				
					Duration of exam	CIA	CE	Total	Credit
	First Semester		Theory	Practicals					
I	23BLT001/ 23BLH001/ 23BLF001	பொதுத்தமிழ்தாள் I- இக்காலஇலக்கியம்/ Prose and Non Detailed Texts/ French	2	-	3	50	50	100	2
II	23BAEEC1	**Ability Enhancement Compulsory Course –I** English for Communication	4	-	3	50	50	100	4
	Generic Elective								
		Generic Elective – I	5+1 / 4+4		3	50	50	100	6
III	**Discipline Specific Core Course**								
	24BAVC01	Elements of Multimedia	4	-	3	50	50	100	4
	24BAVC01P	Multimedia Tools – Practical I	-	4	3	50	50	100	2
									6
	24BAVC02	Visual Design	4	-	3	50	50	100	4
	24BAVC02P	Visual Design - Practical II	-	4	3	50	50	100	2
									6
IV	23BVBNC1/ 23BVBNS1/ 23BVBSP1	**Skill Enhancement Course Value Based Course Elective I-** NCC/NSS/Sports	3/2		2	60	40	100	4/1/1
		Games – Practical	1	-	-	-	-	-	-
								Total	**28/25**
	Second Semester								
I	23BLT002/ 23BLH002/ 23BLF002	பொதுத்தமிழ்தாள் II - அறஇலக்கியம் / Grammar, Translation and General Essay / French II	2	-	3	50	50	100	2
II	23BAEES1	**Ability Enhancement Compulsory Course - II** Environmental Studies	4	-	3	50	50	100	4
	Generic Electives								
	23BENGE2A/ 23BENGE2B/ 23BENGE2C/ 23BENGE2D	**Generic Elective– II Introduction to Literature / British Literature / Modern Indian Literature / New Literatures in English**	5+1	-	3	50	50	100	6

III	**Discipline Specific Core Courses**									
	24BAVC03	Computer Problem Solving	4	-	3	50	50	100	4	6
	24BAVC03P	Computer Problem Solving - Practical III	-	4	3	50	50	100	2	
	24BAVC04	User Interface Design	4	-	3	50	50	100	4	6
	24BAVC04P	User Interface Design – Practical IV	-	4	3	50	50	100	2	
IV	23BVBNC2/ 23BVBNS2/ 23BVBSP2	**Skill Enhancement Course Value Based Course Elective I-** NCC / NSS / Sports	3/2		2	60	40	100	4/1/1	
		Games – Practical	1	-	-	-	-	-	-	
								Total	**28/25**	
	Internship during summer vacation for 15 days									
	Third Semester									
I	23BLT003/ 23BLH003/ 23BLF003	பொதுத்தமிழ்தாள் III - சமயஇலக்கியம்/Ancient and Modern Poetry / French III	2	-	3	50	50	100	2	
II	**Generic Elective**									
		Generic Elective III	5+1 / 4+4		3	50	50	100	6	
III	**Discipline Specific Core Courses**									
	24BAVC05	3D Design	5+1	-	3	50	50	100	6	
	24BAVC06	Game Design Foundation	4	-	3	50	50	100	4	6
	24BAVC06P	Level Design- Practical V	-	4	3	50	50	100	2	
IV		**Skill Enhancement Courses**	-							
	23BSBCS1	**Skill Based Compulsory Course – I** Communication Skill	-	4	3	50	50	100	2	
		Skill Based Elective Course – II	-	4	3	50	50	100	2	
	23BVBNC3/ 23BVBNS3/ 23BVBSP3	**Value Based Course Elective I –** NCC / NSS / Sports	3/2		2	60	40	100	4/1/1	
		Value Based Course Elective II	2	-	-	100	-	100	2	
								Total	**30/27**	
	Fourth Semester									
I	23BLT004/ 23BLH004/ 23BLF004	பொதுத்தமிழ்தாள் IV - சங்கஇலக்கியம்/ Introduction to Functional Hindi and Journalism / French IV	2	-	3	50	50	100	2	
II	**Generic Elective**									
		Generic Elective IV	5+1 / 4+4		3	50	50	100	6	

III	**Discipline Specific Core Courses**									
	24BAVC07	Introduction to C# Scripting	4	-	3	50	50	100	4	6
	24BAVC07P	Video Editing – Practical VI	-	4	3	50	50	100	2	
	24BAVC08	3D Game Development	5+1	-	3	50	50	100	6	
IV	**Skill Enhancement Courses**									
	23BSBSS1	**Skill Based Compulsory Course – III** Soft Skill	-	4	3	50	50	100	2	
		Skill Based Elective Course – IV	-	4	3	50	50	100	2	
	23BVBNC4/ 23BVBNS4/ 23BVBSP4	**Value Based Course Elective I** –NCC / NSS / Sports	3/2		2	60	40	100	4/1/1	
		Value Based Course Elective III	2	-	-	100	-	100	2	
								Total	**30/27**	
	Internship during summer vacation for 15 days									
	Fifth Semester									
III	**Discipline Specific Core Courses**									
	24BAVC09	Introduction to Virtual Reality	4	-	3	50	50	100	4	6
	24BAVC09P	360 Video Design- Practical VII	-	4	3	50	50	100	2	
	24BAVC10	Sound Design and Editing	4	-	3	50	50	100	4	6
	24BAVC10P	Unity VR Development - Practical VIII	-	4	3	50	50	100	2	
	Discipline Specific Elective Courses									
	24BAVDE1- 6	**DSE – I**								
		Theory + Practical / Theory + Tutorial	4+4/5+1		3	50	50	100	6	
	24BAVDE1- 6	**DSE – II**								
		Theory + Practical / Theory + Tutorial	4+4/5+1		3	50	50	100	6	
IV	**Skill Enhancement Courses**									
	23BVBNC5/ 23BVBNS5/ 23BVBSP5	**Value Based Course Elective I** – NCC / NSS / Sports	3/2		**2**	60	40	100	4/1/1	
								Total	**28/25**	
	Sixth Semester									
III	**Discipline Specific Core Courses**									
	24BAVC11	Introduction to Augmented Reality	4	-	3	50	50	100	4	6
	24BAVC11P	Augment Reality Development - Practical IX	-	4	3	50	50	100	2	
	24BAVC12	Introduction to Mixed Reality	4	-	3	50	50	100	4	6
	24BAVC12P	Digital Production Development (unreal)		4	3	50	50	100	2	
	Discipline Specific Elective Courses									
	24BAVDE7-11	**DSE – III** Theory + Practical / Theory + Tutorial	4+4 / 5+1		3	50	50	100	6	
	24BAVDE12	**DSE – IV** Project & Internship	6		-	100	-	100	6	

IV	**Skill Enhancement Courses**							
	23BVBNC6/ 23BVBNS6/ 23BVBSP6	**Value Based Course Elective I** – NCC / NSS / Sports	3/2	2	60	40	100	4/1/1
							Total	**28/25**
							Over all total	**172/154**

- **Ability Enhancement Compulsory Courses**
  - English for Communication
  - Environmental Studies
- **Skill Enhancement Courses**, are Skill Based and / or Value Based which are aimed at providing hands on training, competencies, skills etc. and may be opted by the students from the electives offered by the departments or from SWAYAM MOOCs / NPTEL

Skill Based Courses

- **Skill Based Compulsory course I – 23BSBCS1 – Communication Skill during 3rd semester**
- **Skill Based Compulsory course III - 23BSBSS1 – Soft Skill during 4th semester**

- **Skill Based Courses offered by Information Technology department**

S.No	Skill Based Elective Courses (II / IV)	Semester	Hours of Instruction	Credit/Course
1.	• 24BAVSE1- 3D Modelling & Texturing – Practical	III	4P	2
2.	• 24BAVSE2-3D Game Development- Practical	IV	4P	2

- **Value Based Courses - Elective I**

Value Based Courses Elective I	Subject Code	Semester	No of .Credits
NCC/ NSS/ Sports	23BVBNC1-6/ 23BVBNS1-6/ 23BVBSP1-6	1-6	24 Credits 6 Credits 6 Credits

- **Value Based Courses - Elective II offered by Information Technology Department**

Value Based Courses Elective II	Subject Code	Semester	Hours of Instruction	Credit / Course
-	-	-	-	-

➢ **Discipline Specific Elective Courses** should be related to their own core which may be from SWAYAM MOOCs /NPTEL also

- All the courses have 6 credits with 4 hours of theory and 4hours of practical or 5 hours of theory and 1 hour of Tutorials.

S.No.	DSE Courses	Semester	Hours of Instruction Theory + Practical / Theory + Tutorial	Credits	
1.	24BAVDE1 Internet and Web Programming	V	4	4	6
	24BAVDE1P Internet and Web Programming	V	4	2	
2.	24BAVDE2 Computer Graphics	V	4	4	6
	24BAVDE2P Computer Graphics	V	4	2	
3.	24BAVDE3 Digital Marketing Techniques	V	5+1	6	
4.	24BAVDE4 UI Design Theory	V	5+1	6	
5.	24BAVDE5 Animation Design Theory	V	5+1	6	
6.	24BAVDE6 Mobile VR Development	V	4	4	6
	24BAVDE6P Mobile VR Development	V	4	2	
7.	24BAVDE7 Data Security and Privacy	VI	5+1	6	
8.	24BAVDE8 Artificial Intelligence	VI	5+1	6	
9.	24BAVDE9 Introduction to Metaverse	VI	5+1	6	
10.	24BAVDE10 Design Lighting Techniques	VI	5+1	6	
11.	24BAVDE11 Data Visualization with Augmented Reality	VI	4	4	6
	24BAVDE11P Data Visualization with Augmented Reality	VI	4	2	
12.	24BAVDE12 Project & Internship	VI	6	6	

- **Generic Elective Courses offered for other disciplines / departments**
  - A Core Course offered in a Discipline/ Subject may be offered as a Generic Elective for other departments.

S.No	Generic ElectiveCourses	Semester	Hoursof Instruction	Credits
			Theory + Practical / Theory+Tutorial	
1.	**24BAVGE1** Fundamentals of Multimedia	I	5+1	6
2.	**24BAVGE2** Introduction to Augmented Reality	III	5+1	6
3.	**24BAVGE3** Introduction toMetaverse	IV	5+1	6

Totalcredits toearnthedegree

1. PartIcomponents -8 Credits(Languages)
2. PartIIcomponents -32 Credits (AbilityEnhancement Compulsory Courses–8Credits,and GenericElective Courses –24Credits)
3. Part III components- 96 Credits (Discipline Specific Core Courses – 72 Credits and DisciplineSpecificElectiveCourses-24 Credits)
4. Part IV Components - 36 /18 Credits (Skill Enhancement Courses - Skill Based Courses – 8 Credits,Value Based Courses ElectiveI(NCC/NSS/Sports)–24/6 / 6,ValueBased Elective Courses II& III–4 Credits)
5. MinimumOneCourseshouldbefromSWAYAMMOOCs/ NPTEL.

One to 4 Courses may be from SWAYAM MOOCs/NPTEL for Credit Transfer in DSE/GenericElective.

Elements of Multimedia

Semester I
24BAVC01

Hours of Instruction/week: 4
No of credits: 4

Course Objectives:

1. To acquire knowledge about multimedia and its various elements.
2. To understand text, graphics, and other visual elements of composition.
3. To learn the process behind video, animation, and other moving graphics.
4. To obtain idea of a Multimedia project production.
5. To understand HCI and multimedia interaction for application development.

Unit I Overview of Multimedia Systems. 12

Multimedia, Multimedia Objects, Multimedia in business and schools, Multimedia at Home, Multimedia in Public Places, Virtual reality, Delivering Multimedia, CD-ROM,DVD, Flash drives, The Internet. The Power of Text, Fonts and Faces, Text in Multimedia, Computer & Text, Font editing and design tools, Hypermedia and Hyper Text

Unit II Graphics & Audio **12**

The power of Digital Graphics, configure your workspace, making still images, Computer color & Palettes, Image file formats, The power of Sound, Digital Audio, MIDI Audio, Digital audio vs MIDI, Multimedia sound systems, Audio file formats, Audio compression and codecs, Law of Multimedia Minimums, Adding & Editing sound to your projects

Unit III Moving Images **12**

The power of Animation, Principles of Animation, Traditional Animation, Animation by computer, creating animation, The power of Video, Analog & Digital videos, Digital Video containers, CODECS, Acquire video, Shooting video, Composition, Tittle, Editing – Non Linear

Unit IV Multimedia Project **12**

Stages of Multimedia, Intangibles, Multimedia skills, Hardware, Software, authoring systems, Planning, Costing, Process of Making multimedia, Preproduction, Scheduling, Estimation, RFPS & Bid proposals, Designing, Producing, Content, Talent.

Unit V Multimedia Today **12**

Internet History, Multimedia on the web, Multimedia elements on the web, Mobile Multimedia, Digital revolution, Mobile Hardware, 4G, 5G, Mobile operating systems, Delivering multimedia, Testing, Archives, Versioning, CD-ROM, DVD, Delivering on WWW, Delivering via App stores, Introduction to Augmented and Virtual Reality.

Text Book: **Total Hours:60**

1. **Tay Vaughan(2014)**, *Multimedia: Making it Work*, 9th Edition, McGraw Hill Education
2. **Gerard Jounghyun Kim(2005),** *Designing Virtual Reality System,*Springer

Reference Books:

1. **Ranjan Parekh,** Principles of Multimedia, 2nd Edition, McGraw Hill Education, 2013.
2. **S.Gokul,** *Multimedia Magic*, BPB Publications, 2nd Edition.

3. **Kiran Thakrar, Prabhat k.andleigh,** *Multimedia System Design*, Prentice Hall India.
4. **Malay k Pakhira,** *Computer graphics, Multimedia and Animation*, Prentice Hall India, 2nd Edition

Web References:

1. https://onlinecourses.nptel.ac.in/noc20_cs90/preview
2. https://www.coursera.org/illinois
3. Applied Digital Literacy Specialization [3 courses] (SUNY) | Coursera
4. https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm

Course Outcomes:

On successful completion of this course, the student will be able to

1. Define multimedia systems and their relation to Virtual reality.
2. Implement various formats of graphic and text handling.
3. Capable of appreciating video and animation editing techniques.
4. Know how to design various multimedia project outputs.
5. Develop underlying ideas about internet, interactivity and virtual reality.

CO-PO Mapping and Matrix

CO / PO	P\O 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

Multimedia Tools – Practical I

Semester I
24BAVC01P

Hours of Instruction/week: 4
No of credits: 2

Course Objectives:

1. To understand internet process for communication.
2. To learn multimedia tools for image manipulation and editing.
3. To learn multimedia authoring tools for project handling.
4. To explore and create textual data into visual formats.
5. To use audio tools for recording and producing audio.

List of Exercises

1. Create your online identity with email, LinkedIn profile and online portfolio registration.
2. Create a simple word document which lists all components of a multimedia PC.
3. Create a personnel calendar toolusing a word processor.
4. Create a summary report with text, images and charts on a given topic for 1500 words.
5. Create an expense report in g-sheet listing out the expenses and using formula for summation.
6. Create a simple logo using type for your imaginary company using any logo creator
7. Create a simple get-well message card with a famous quote, for your friend whohad an accident.
8. Using a simple photo editor create a simple invitation for a birthday.
9. Capture a new audio file for an existing video and export it in multiple formats for distribution.
10. Create your first video remix using any video editing tool and export it into an .MP4 format.
11. Create your business plan for handling a simple video shoot project in under 3 mins.
12. Create a simple animation meme and export them as a .gif file.
13. Create a infographic that depicts the keys facts of wildlife in India as a presentation slide in vertical format.
14. Record audio and add various reverb sounds to it.
15. Produce a podcast episode in any language and publish them in any platform.

Total Hours:60

Web References:

1. Create videos with Canva – Design School
2. Tamil Podcast Creation Video - https://youtu.be/efHrLsAPOTc
3. https://www.coursera.org/learn/create-video-audio-and-infographics-for-online-learning
4. https://www.adobe.com/express/create/infographic
5. https://www.unictool.com/change-voice/audactiry-voice-changer/

Course Outcomes:

On successful completion of this course, the student will be able to

1. Demonstrate ability to create text content using computer.
2. Demonstrate ability to create an online identity.
3. Know how to evaluate the capability of the multimedia system and project.
4. Develop computer graphics using simple image manipulation tools.
5. Develop computer-based video and animation using authoring or editing tools.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

Visual Design

Semester I
24BAVC02

Hours of Instruction/week: 4
No of credits: 4

Course Objectives:

1. To acquire knowledge about multimedia and its various elements.
2. To understand text, graphics, and other visual elements of composition.
3. To learn the process behind video, animation, and other moving graphics.
4. To obtain idea of a Multimedia project production.
5. To understand HCI and multimedia interaction for application development.

Unit I: Introduction 12

Design Elements - Introduction Elements of Design - Line -Shape -Negative Space- Volume - Value - Color - Texture - Principles of Design - Introduction - Gestalt - Unity or Harmony - Unity and Placement Using Line - Unity and Placement Using Shape - Repetition Using Line - Repetition Using Shape - Rhythm - Unity Using Value - Unity and Continuity - Variety - Focal Point and Visual Hierarchy – Balance

Unit II: Design Process **12**

Introduction to Design Projects - Conceptual Process - Step 1: Research and Define the Problem - Step 2: Preliminary Solutions, Organized List of Options, and Thumbnail Sketches - Step 3: Roughs—Refined Preliminary Visual Design Solutions and Alternatives - Step 4: Composites or Comps - Step 5: The Final Design or Finish - Production Process - Computer Applications Used in Design - Software Applications for Graphics

Unit III: Abstraction **12**

Introduction to Abstraction - Four Basic Methods of Abstraction - Method One: Simplification - Content: The Basic Problem Defined - Background: Shape - Conceptual Process - Production Process - Scanning Basics - The Rectangle and Ellipse Tools - Using Basic Shapes to Create the First Design - Method Two: Repetition - Content: The Basic Problem Defined - Background - Conceptual Process - Production Process

Unit IV: Abstraction for Logo **12**

Abstraction Using Line And Shape - Method Three: Line and Shape - Content: The Basic Problem Defined - Background - Conceptual Process - Production Process - Changing the Weight - Changing Caps and Joins - Changing Stroke Alignment - Method Four: Type Combination - Conceptual Design Process and Discerning the Interesting Parts of Letterforms - Production Process - Converting Type to Paths: Creating Outlines - Using the Transform Tools: Reflect and Scale - The Direct Selection Tool: "Pulling" Points - Changing Fills and Strokes Using the Tools Panel - Using the Transform Tools: Rotate and Scale - using methods of abstraction to create a logo

Unit V: Design Process Documentation **12**

Introducing The Design Method, Fundamental Stages of The Design Method, Discovery Planning Creative Application, Planning for Interaction, Developing Personas, Scenarios, User Stories, and Use Cases, Flowcharting Actions, Planning a Sitemap, Building Wireframes, Determining Content Strategy, Crafting the Creative Brief, Preparing Documentation, Keeping Your Design Project Moving

Total Hours:60

Text Book:

1. **Alan Hashimoto and Mike Clayton(2009),** *Visual Design Fundamentals: A Digital Approach,* 3rd Edition, Cengage learning, Charles River Media
2. **Eric Karjaluoto(2013),** *The Design Method: A Philosophy and Process for Functional Visual Communication,* New Riders

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.
5. **Colin Ware (2008),** *Visual Thinking for Design, Morgan Kaufmann Series in Interactive Technologies*

Web References:

1. https://coursesity.com/course-detail/analysis-of-everyday-things
2. https://extendedstudies.ucsd.edu/courses-and-programs/graphic-and-web-design
3. https://www.masterclass.com/articles/elements-of-design-explained
4. https://designwizard.com/blog/elements-of-design/
5. https://creativemarket.com/blog/10-basic-elements-of-design

Course Outcomes:

On successful completion of this course, the student will be able to

1. Interpret design visual language.
2. Conduct design appreciation for various elements.
3. Build wireframes and design patterns for interaction.
4. Know how to use design abstraction for simplification.
5. Develop design brief and build personas for design research.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

Visual Design – Practical II

Semester I
24BAVC02P

Hours of Instruction/week: 4
No of credits: 2

Course Objectives:

1. To Develop specialized drawing skills that can be applied in the fields of illustration andgraphic design.
2. To Create a visual-verbal connection between the content and the image using traditional and/or digital media.
3. To learn and understand the basics of digital graphic formats.
4. To demonstrate ability to manipulate images as per requirements for design messaging.
5. To create a visual-verbal connection between the content and the image using traditional and/or digital media.

List of Exercises

1. Create a simple cartoon airplane with colors.
2. Create a glass jar and color it with shadows.
3. Design a Logo for the given brief of a company.
4. Design a business card for the given brief of the company.
5. Design any 5 flat icons with colors.
6. Create a Mock Mobile screen with logos and other functionalities.
7. Create posters using principles like Positive & Negative space, Emphasis, Repetition and contrast.
8. Convert and Color the given Images with Mono chromatic colors scheme.
9. Create a restaurant menu card with all images and text by connecting with a local restaurant.
10. Paint textures as per given instruction into the given stencil.
11. Design posters with Dots and lines for the given themes.
12. Create a be spoke patterns for gift wrapping paper.
13. Create a visual storyboard using photo editing techniques.
14. Create a book cover based on the design style of steampunk.
15. Create a poster inviting your friends for your college techcofest.

Total Hours:60

Web References

1. https://coursesity.com/course-detail/analysis-of-everyday-things
2. Envato Tutorials - https://youtu.be/Ib8UBwu3yGA
3. https://www.skillshare.com/classes/Mastering-Illustrator-10-Tips-Tricks-to-Speed-Up-Your-Workflow/1583544555
4. https://www.creativelive.com/class/adobe-illustrator-cc-essentials-for-creating-projects-brian-wood
5. https://extendedstudies.ucsd.edu/courses-and-programs/graphic-and-web-design

Course Outcomes:

On successful completion of this course, the student will be able to

1. Demonstrate ability to balance design space in computer.
2. Apply design principles to correct, edit or create well balanced design messages.
3. Know how to create both raster and vector graphics for implementation in various projects.
4. Develop computer graphics using simple image manipulation tools.
5. Create imageries for digital screens in a 2D space for various requirements.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

Computer Problem Solving

Semester II
24BAVC03

Hours of Instruction/week: 4
No of credits: 4

Course Objectives:

1. To acquire knowledge about multimedia and its various elements.
2. To understand text, graphics, and other visual elements of composition.
3. To learn the process behind video, animation, and other moving graphics.
4. To obtain idea of a Multimedia project production.
5. To understand HCI and multimedia interaction for application development.

Unit I: Overview of Computer Structure & Programming: **12**

Basics of Computer Architecture: processor, Memory, Input& Output devices, Application Software & System software, - Computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Programming environment – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters, Introduction to structured approach to programming.

Unit II: Fundamentals of C Programming: **12**

Structure of C program: Character set, Tokens, Identifiers in C, Variables and Data Types, Constants, Console IO Operations, printf and scanf Operators and Expressions: Expressions and Arithmetic Operators, Relational and Logical Operators, Conditional operator, size of operator, Assignment operators and Bitwise Operators. Operators Precedence Control Flow Statements: If Statement, Switch Statement, Unconditional Branching using goto statement, While Loop, Do While Loop, For Loop, Break and Continue statements.

Unit III: Arrays: **12**

Arrays-single & multidimensional arrays, String processing: In built String handling functions (strlen, strcpy, strcat and strcmp, puts, gets), Array based String operations, Linear search program, simple programs covering arrays and strings

Unit IV: Functions **12**

Working with functions Introduction to modular programming, writing functions, formal parameters, actual parameters Pass by Value, Recursion, Arrays as Function Parameters structure, union, Storage Classes, Scope and life time of variables, simple programs using functions.

Unit V: Pointers & File **12**

Pointers- The & and * operator, Pointer expression, Assignments, Structures- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure - pointers.- NULL pointer,array access using pointers, pass by reference effect - File Operations: open, close, read, write, append

Total Hours:60

Text Books:

1. **Teodor Rus(2015)**, *Computer-based Problem-Solving Process,* World Scientific Publishing Co Pte Ltd
2. **E. Balagurusamy(2018)**, *Computing Fundamentals and C Programming*, 2nd Edition, McGraw Hill Education

Reference Books:

1. **Byron S. Gottfried (1996),** Programming with C, 2nd Edition, McGraw Hill Education.
2. **Luciano Manelli (2015),** *Understanding Algorithms and Flowcharts: step by step explanations of simple and complex algorithms with implementation in C*, Createspace Independent Pub
3. **Anita Goel and Ajay Mittal (2016)**, *Computer fundamentals and Programming in C,* Pearson Education India
4. **Brian W. Kernighan and Dennis M. Ritchie (2015),** *C Programming Language,* Pearson Education India
5. **Rajaraman V (2018),** *Computer Basics and Programming in C*, PHI Learning

Web References:

1. https://coursetakers.com/uk/professional/it/programming/c-programming
2. https://www.imperial.ac.uk/continuing-professional-development/short-courses/eng/computing/courses/intro-c-programming/
3. https://www.coursera.org/specializations/c-programming
4. https://www.udemy.com/course/get-started-with-programming-in-c-full-course/
5. https://onlinecourses.nptel.ac.in/noc20_cs91/preview

Course Outcomes:

On successful completion of this course, the student will be able to

1. Understand computer architecture fundamentals.
2. Understand various program types and styles.
3. Know how to design solutions using programming languages.
4. Implement various data & data types for operations in programming.
5. Capable of writing code with algorithm, flowchart and simple data structures.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

Computer Problem Solving – Practical III

Semester II
24BAVC03P
Hours of Instruction/week: 4
No of credits: 2

Course Objectives:

1. To study the computer programming environment.
2. To analyze instructions and information process in computer language.
3. To learn how to write algorithms to build a simple series of instructions.
4. To apply programing skills to solve a series of problems.
5. To learn to troubleshoot computer in terms of architecture and hardware.

List of Exercises

1. Draw the basic computer as a block diagram.
2. Write pseudo code that reads two numbers and multiplies them together and print out their product.
3. Write pseudo code that tells a user that the number they entered is not a 5 or a 6.
4. Write pseudo code that will count all the even numbers up to a user defined stopping point.
5. Write pseudo code that reads in three numbers and writes them all in sorted order.
6. Write a program to do the following basic operations in C,
    - Display "Hello World".
    - Read two numbers, add them, and display theirsum.
    - Read the radius of a circle, calculate its area, and display it.
7. Read 3 integer values and find the largest among them.
8. Read a Natural Number and check whether the number is prime or not.
9. Read a Natural Number and check whether the number is Armstrong or not.
10. Read n integers, store them in an array and find their sum and average.
11. Read a string (word), store it in an array and check whether it is a palindrome word or not.
12. Read two strings (each one ending with a $ symbol), store them in arrays and concatenate them without using library functions.
13. Find the factorial of a given Natural Number n using recursive and non-recursive functions.
14. Open a text input file and count number of characters, words and lines in it; and store the results in an output file.
15. Do the following using pointers.
    - i) add two numbers
    - ii) swap two numbers using a user defined function

Total Hours:60

Web References:

1. https://coursetakers.com/uk/professional/it/programming/c-programming
2. https://www.imperial.ac.uk/continuing-professional-development/short-courses/eng/computing/courses/intro-c-programming/
3. https://www.coursera.org/specializations/c-programming
4. https://www.udemy.com/course/get-started-with-programming-in-c-full-course/
5. https://onlinecourses.nptel.ac.in/noc20_cs91/preview

Course Outcomes:

On successful completion of this course, the student will be able to

1. Analyze a computational problem and develop an algorithm/flowchart to find its solution.
2. Write readable C programs with arrays, structure, or union for storing the data to be processed.
3. Divide a given computational problem into several modules and develop a readable multi-function C program.
4. Write readable C programs which use pointers for array processing and parameter passing.
5. Develop readable C programs with files for reading input and storing output.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

User Interface Design

Semester II
24BAVC04

Hours of Instruction/week: 4
No of credits: 4

Course Objectives:

1. To study about user interaction elements.
2. To understand HCI foundations.
3. To learn user experience and user centric design.
4. To understand capturing user requirements
5. Study various layouts and navigational structures for digital screens.

Unit I 12

Introduction to HCI - Human-Computer Interaction Foundations, Models & Theories, Programming interactive systems, KISS principle

Unit II 12

User Experience Design (UXD or UED) - Overview of UX, Elements of UX, UX Design Process – Research – Design – Prototyping –Testing – Measurements, UX Analysis, Design Thinking – Thinking out of box – Empathy –Design Thinking Process, User research, Planning

Unit III 12

User Centered Design: Overview, Principles, Research, Elements of UCD, User Centered Design Process, Benefits of user centered process.

Unit IV 12

User Interface Design (UI): Overview of UI, Importance of UI, Characteristics, Design Process, Visual design Concepts, Graphical User interface, Design Tools, Navigation and structure, Composition and Layout Design, Design Icons, Graphic symbols, Design Patterns and Style guides, Interaction Styles, Naming & Abbreviations.

Unit V 12

The Spatial Computing Era - mapping the Territory: UX / XR- The History and Future of XR - UX Before Oculus VR - The Timeline of UX for AR Devices - The Decade That Defined XR - The Elements of XR -VR UX: Usability First - Setting the Bar for VR Usability - The Elements of VR Usability - VR Usability Heuristics - AR Application Types and Device Categories - Projection-Based AR - UX Design for AR Spaces..

Text Book: **Total Hours:60**

1. **Eric Karjaluoto(2013),** *The Design Method: A Philosophy and Process for Functional Visual Communication,* New Riders
2. **Norman, D. A. (1988).** *The psychology of everyday things.* New York: Basic Books

Reference Books:

1. **Jeff Gothelf & Josh Seiden (2016),** *Learn UX: Designing Great Products with Agile Teams*, Second edition, O Reiley Pub
2. **Brian Still (2016),** *Fundamentals of User-Centered Design: A Practical Approach*, 1st edition, CRC Press
3. **Wilbert O.Galitz (2002)** ,*The Essential Guide to user Interface Design: An Introduction to GUI Design Principles and Techniques,* Second edition, Wiley Pub
4. **Alan Dix and Janet Finlay (2004),** *Human-computer Interaction,* Pearson Education.
5. **Gibson, J. J. (1977).** *The theory of affordances. In R. E. Shaw & J. Bransford (Eds.), Perceiving, Acting, and Knowing. Hillsdale, NJ: Lawrence Erlbaum Associates.*

Web References:

1. https://www.codecademy.com/learn/intro-to-ui-ux
2. https://www.mygreatlearning.com/academy/learn-for-free/courses/ui-ux
3. https://www.interaction-design.org/literature/topics/ui-design
4. https://www.freecodecamp.org/news/ui-ux-design-guide/
5. https://careerfoundry.com/en/blog/ui-design/how-to-design-a-mobile-app-using-user-interface-design-principles/

Course Outcomes:

On successful completion of this course, the student will be able to

1. Interpret interaction design.
2. Conduct persona research and collect user data for planning.
3. Build system design by using the right interaction hardware with actions
4. Create simple and interactive prototypes for iteration.
5. Develop layouts for mobile applications.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M

User Interface Design – Practical IV

Semester II
24BAVC04P
Hours of Instruction/week: 4
No of credits: 2

Course Objectives:

1. To learn and study the impact of visual spaces in digital screen environment.
2. To create storyboards and wireframes that represent user interaction and flow of information.
3. To learn and understand the principles of User interface.
4. To apply principle of user interface and demonstrate ability to create coherent UI solutions.
5. To create final mockup of the interface adhering to Information and functional requirements of a brief.

List of Exercises

1. List 5 sites with good UI design, and 5 with bad design. For each, articulate in your own words why you believe it works or doesn't work with regards to Contrast, Repetition, Alignment and Proximity
2. List 5 apps with good UI design, and 5 with bad design. For each, articulate in your own words why you believe it works or doesn't work in regards to Contrast, Repetition, Alignment, Progressive disclosure, Consistency and Proximity
3. List out the principles of Good UI and attach 5 references for each of them.
4. Copy the UI of a good site pixel-for-pixel.
5. Copy the UI of a good app pixel-for-pixel.
6. Create 2-3 style tiles for fonts in your database that you particularly want to experiment with. Think of a concept for a site, then design out a style tile featuring:
    - Realistic font choices and text elements (e.g., headers, navigational elements, body text)
    - Appropriate color palette
    - Example form controls or imagery.
    - Logo (optional)
7. Copya simple widget to display rain and weather information in a computer screen in windows environment. List out the IA and visual design storyboard in detail.
8. Redesign a simple widget to display rain and weather information on a computer screen in an android environment.
9. Redesign a simple widget to display calendar information on a computer screen in an android environment.
10. Design a signup form with some easy data types, and some challenging ones (date ranges, colors, image uploads, etc.) focus on the CTA conversion for a NGO with social cause.
11. Design anInstagram signup post with some easy data types, and some challenging ones (date ranges, colors, image uploads, etc.) focus on the CTA conversion for a yoga class.
12. Re-Design 1-3 screens of an app/website that you're most interested in working on.
13. Design betterTNSTC bus transit timetables, maps, and signage in a bus stop.
14. Create aninterface design mockup for a kiosk at a train stop,its purpose is to let regular commuters buymonthly transit passes.
15. Design an application for a local restaurant for online food ordering.

Total Hours:60

Web References:

1. https://www.figma.com/resource-library/ui-design-principles/
2. https://www.udemy.com/course/fundamentals-of-user-interface-design/
3. https://balsamiq.com/learn/courses/ui-design-psychology/
4. https://coursesity.com/course-detail/visual-elements-of-user-interface-design
5. https://speckyboy.com/5-simple-ux-exercises-will-change-decision-makers-think/

Course Outcomes:

On successful completion of this course, the student will be able to

1. Know how to deconstruct various UI projects.
2. Demonstrateability to gather information for interactions.
3. Apply design principles to interaction design for user engagement.
4. Develop user centric design to enable fluidic application experience.
5. Create imageries as required like icons, fonts, symbols, etc to build final UI mockups.

CO-PO Mapping and Matrix

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	L	H	H	M	L	L	L	L	L	L	L	L	M
CO 2	L	H	H	M	L	L	M	L	H	H	H	M	M
CO 3	L	M	H	M	L	L	L	L	L	L	M	M	M
CO 4	M	M	H	M	L	L	M	M	M	M	M	M	M
CO 5	L	H	H	M	L	M	M	M	M	M	H	M	M