DEPARTMENT OF MEDIA SCIENCES
ANNA UNIVERSITY, CHENNAI

VISION

- To offer quality media studies and research, using state-of-the-art images for building an inter-disciplinary knowledge base, so as to contribute to development and democracy.

- To produce creative and technically apt professionals for the media industry.

- The theoretical and practical media courses taught in the PG programme will improve, explore, innovate and implement core media techniques by "learn by doing" philosophy.

- The PG programme will continue to prepare students for professional and personal success in today's exciting and innovative media landscape.

MISSION

- To create an enabling environment to nurture ideas, freedom of expression, creativity and scholarship, and develop leaders in the arena of media and mass communication.

- The mission of the PG programme is to excel in media education on fundamental media concepts, values and skills in various platforms that focus on problem solving, critical thinking, innovation and communications.

- To promote the understanding of ethical and legal implication of all forms of media and the importance of cultural and intellectual diversity, techno-savvy, civic engagement and social responsibility in preparing the students for leadership role in media industry.

- To enable students to understand the role of media in nation building.

- To instill a sense by creating and innovation among journal minds for better societal contribution.

ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
M.Sc. MULTIMEDIA (specialization in VISUAL COMMUNICATION) (TWO YEARS)
REGULATIONS 2019
CHOICE-BASED CREDIT SYSTEM

1. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

1. To impart specialized skills required to design and develop interactive multimedia content.
2. To empower multimedia students to focus on creating interactive experiences for users through engaging interfaces through digital media.
3. To provide students with strong foundation in media studies, creativity and information technology.
4. To enhance their ability to effectively disseminate information and messages by incorporating vital multimedia elements that attract and retain the attention of the users.
5. To prepare students to carry out multimedia research that will have benefits for the society.

2. PROGRAMME OUTCOMES (POs):

After the completion of the two-year period of study, the following outcomes are expected:

PO #	Programme Outcomes
1	Students will be able to impart a technically-sound working knowledge of different multimedia software required for various purposes.
2	Students should be able to demonstrate necessary skills required to produce interactive multimedia content.
3	Students should be able to apply various creative techniques and critical thinking methods in multimedia production and problem solving.
4	Students will be able to independently carry out research and find solution to the identified problems.
5	Students will have an ability to write and present them efficiently to provide novel and greater enhanced experiences to users.
6	Students will be able to develop socially relevant products with multimedia elements by applying technical knowledge and ethical principles.

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3. PROGRAMME SPECIFIC OUTCOMES (PSOs):

By the completion of the M.Sc. MULTIMEDIA (specialization in VISUAL COMMUNICATION) programme, the students will have the following programme specific outcomes.

1. Students will gain broad knowledge on both designing and technical aspects related to multimedia content creation.
2. Students will have the necessary skills to design, develop and analyse different multimedia content.
3. Students will have the flexibility to choose their career from a variety of diverse opportunities that are available in multimedia industries.
4. Students will be able to integrate traditional media and digital media ethically.
5. Students will have in-depth knowledge on research methodology and will be able to pursue research and identify/implement new practices that will be beneficial to the society.

4. MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the programme educational objective and the programme outcome is given in the following table.

Programme Educational Objectives	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
PEO 1	✓	✓	✓		✓	✓
PEO 2	✓	✓	✓	✓	✓	
PEO 3	✓	✓	✓	✓	✓	✓
PEO 4	✓	✓	✓		✓	✓
PEO 5				✓	✓	✓

5. MAPPING OF COURSE OUTCOMES AND PROGRAMME OUTCOMES

		COURSE TITLE	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
Year 1	Semester 1	Scripting Writing and Story-Boarding		✓	✓	✓	✓	✓
		User Experience Design	✓	✓		✓		✓
		Audiography and Videography	✓	✓			✓	✓
		Theories of Visual Analysis			✓	✓		
		Python Programming	✓		✓			
		Drawing Lab	✓	✓		✓	✓	✓
		User Experience Design Lab	✓	✓	✓	✓	✓	✓
		Photography Lab	✓			✓	✓	✓
		Audiography and Videography Lab	✓	✓		✓	✓	✓
	Semester 2	Digital Art	✓	✓		✓	✓	✓
		2D Animation	✓	✓		✓	✓	✓
		User Interface Development	✓	✓		✓	✓	✓
		3D Modeling and Animation	✓	✓		✓	✓	✓
		2D Animation Lab	✓	✓		✓	✓	✓
		User Interface Development Lab	✓	✓		✓	✓	✓
		3D Modeling and Animation Lab	✓	✓		✓	✓	✓
Year 2	Semester 3	2D Game Design and Development	✓	✓		✓	✓	✓
		Visual Effects	✓	✓			✓	✓
		Research Methodology for Visual Media				✓		✓
		Data Analysis Lab	✓		✓	✓		
		2D Gaming Lab	✓	✓		✓	✓	✓
		Visual Effects Lab	✓	✓			✓	✓
	Semester 4	Dissertation	✓	✓	✓	✓	✓	✓

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6. MAPPING OF ELECTIVES OUTCOMES AND PROGRAMME OUTCOMES

	COURSE TITLE	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
ELECTIVE - I	Aesthetics of Films	✓		✓	✓		✓
	Media Management			✓	✓	✓	✓
	Big Data Analytics	✓		✓	✓	✓	✓
	Editing Techniques	✓	✓				✓
	Advanced Illustration	✓	✓			✓	✓
ELECTIVES – II & III	Lighting and Rendering	✓	✓		✓		✓
	Human-Centred Interaction Design	✓	✓	✓	✓	✓	✓
	Game Psychology	✓		✓	✓	✓	✓
	Character Designing	✓	✓		✓		✓
	Programming for Gaming	✓	✓	✓	✓		✓
	Image Processing	✓	✓	✓	✓		✓
	Instructional Design for Digital Media	✓	✓	✓	✓	✓	✓
	Deep Learning	✓		✓	✓	✓	✓
ELECTIVE - IV	Advanced Compositing Techniques	✓	✓			✓	✓
	Motion Graphics	✓	✓				✓
	3D Game Development	✓	✓		✓	✓	✓
	Virtual and Augmented Reality Development	✓	✓		✓	✓	✓
	Mobile Gaming	✓	✓		✓	✓	✓
	Sensor-Based Data Collection and Management	✓		✓	✓	✓	✓

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M.Sc. MULTIMEDIA (specialization in VISUAL COMMUNICATION) (TWO YEARS)

REGULATIONS 2019
CHOICE-BASED CREDIT SYSTEM
CURRICULA AND SYLLABI

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MV5101	Scripting Writing and Story-Boarding	PCC	3	0	0	3	3
2.	MV5102	User Experience Design	PCC	3	0	0	3	3
3.	MV5103	Audiography and Videography	PCC	3	0	0	3	3
4.	MV5104	Theories of Visual Analysis	PCC	3	0	0	3	3
5.	MV5105	Python Programming	PCC	3	0	0	3	3
6.		Audit Course – I*	AC	2	0	0	2	0
PRACTICAL								
7.	MV5111	Drawing Lab	PCC	0	0	4	4	2
8.	MV5112	User Experience Design Lab	PCC	0	0	4	4	2
9.	MV5113	Photography Lab	PCC	0	0	4	4	2
10.	MV5114	Audiography and Videography Lab	PCC	0	0	4	4	2
			TOTAL	17	0	16	33	23

*Audit Course is Optional

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MV5201	Digital Art	PCC	2	0	2	4	3
2.	MV5202	2D Animation	PCC	3	0	0	3	3
3.	MV5203	User Interface Development	PCC	3	0	0	3	3
4.	MV5204	3D Modeling and Animation	PCC	3	0	0	3	3
5.		Programme Elective – I	PEC	3	0	0	3	3
6.		Audit Course – II*	AC	2	0	0	2	0
PRACTICAL								
7.	MV5211	2D Animation Lab	PCC	0	0	4	4	2
8.	MV5212	User Interface Development Lab	PCC	0	0	4	4	2
9.	MV5213	3D Modeling and Animation Lab	PCC	0	0	4	4	2
			TOTAL	16	0	14	30	21

*Audit Course is Optional

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SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MV5301	2D Game Design and Development	PCC	3	0	0	3	3
2.	MV5302	Visual Effects	PCC	3	0	0	3	3
3.	MV5303	Research Methodology for Visual Media	RMC	3	0	0	3	3
4.		Programme Elective - II	PEC	2	0	2	4	3
5.		Programme Elective – III	PEC	2	0	2	4	3
PRACTICAL								
6.	MV5311	Data Analysis Lab	PCC	0	0	4	4	2
7.	MV5312	2D Gaming Lab	PCC	0	0	4	4	2
8.	MV5313	Visual Effects Lab	PCC	0	0	4	4	2
9.	MV5314	Industrial Project (Summer)	EEC	-	-	-	-	2
			TOTAL	13	0	18	29	23

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Programme Elective - IV	PEC	2	0	2	4	3
2.		Open Elective	OEC	3	0	0	0	3
PRACTICAL								
3.	MV5411	Dissertation	EEC	0	0	24	24	12
			TOTAL	5	0	26	28	18

TOTAL CREDITS FOR THE PROGRAMME: 85

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PROGRAM CORE COURSES (PCC)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			CREDITS	SEMESTER
				L	T	P		
1.	MV5101	Scripting Writing and Story-Boarding	PCC	3	0	0	3	1
2.	MV5102	User Experience Design	PCC	3	0	0	3	1
3.	MV5103	Audiography and Videography	PCC	3	0	0	3	1
4.	MV5104	Theories of Visual	PCC	3	0	0	3	1
5.	MV5105	Python Programming	PCC	3	0	0	3	1
6.	MV5111	Drawing Lab	PCC	0	0	4	2	1
7.	MV5112	User Experience Design Lab	PCC	0	0	4	2	1
8.	MV5113	Photography Lab	PCC	0	0	4	2	1
9.	MV5114	Audiography and Videography Lab	PCC	0	0	4	2	1
10.	MV5201	Digital Art	PCC	2	0	2	3	2
11.	MV5202	2D Animation	PCC	3	0	0	3	2
12.	MV5203	User Interface Development	PCC	3	0	0	3	2
13.	MV5204	3D Modeling and Animation	PCC	3	0	0	3	2
14.	MV5211	2D Animation Lab	PCC	0	0	4	2	2
15.	MV5212	User Interface Development Lab	PCC	0	0	4	2	2
16.	MV5213	3D Modeling and Animation Lab	PCC	0	0	4	2	2
17.	MV5301	2D Game Design and Development	PCC	3	0	0	3	3
18.	MV5302	Visual Effects	PCC	3	0	0	3	3
19.	MV5311	Data Analysis Lab	PCC	0	0	4	2	3
20.	MV5312	2D Gaming Lab	PCC	0	0	4	2	3
21.	MV5313	Visual Effects Lab	PCC	0	0	4	2	3
						TOTAL CREDITS	53	

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PROGRAM ELECTIVE COURSES (PEC) I, II, III & IV

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
ELECTIVES (THEORY) FOR PROGRAMME ELECTIVE - I								
1.	MV5001	Aesthetics of Films	PEC	3	0	0	3	3
2.	MV5002	Media Management	PEC	3	0	0	3	3
3.	MV5003	Big Data Analytics	PEC	3	0	0	3	3
4.	MV5004	Editing Techniques	PEC	3	0	0	3	3
5.	MV5005	Advanced Illustration	PEC	3	0	0	3	3
ELECTIVES (LAB-BASED THEORY) FOR PROGRAMME ELECTIVES – II & III								
6.	MV5006	Lighting and Rendering	PEC	2	0	2	4	3
7.	MV5007	Human-Centred Interaction Design	PEC	2	0	2	4	3
8.	MV5008	Game Psychology	PEC	2	0	2	4	3
9.	MV5009	Character Designing	PEC	2	0	2	4	3
10.	MV5010	Programming for Gaming	PEC	2	0	2	4	3
11.	MV5011	Image Processing	PEC	2	0	2	4	3
12.	MV5012	Instructional Design for Digital Media	PEC	2	0	2	4	3
13.	MV5013	Deep Learning	PEC	2	0	2	4	3
ELECTIVES (LAB-BASED THEORY) FOR PROGRAMME ELECTIVE - IV								
14.	MV5014	Advanced Compositing Techniques	PEC	2	0	2	4	3
15.	MV5015	Motion Graphics	PEC	2	0	2	4	3
16.	MV5016	3D Game Development	PEC	2	0	2	4	3
17.	MV5017	Virtual and Augmented Reality Development	PEC	2	0	2	4	3
18.	MV5018	Mobile Gaming	PEC	2	0	2	4	3
19.	MV5019	Sensor-Based Data Collection and Management	PEC	2	0	2	4	3

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RESEARCH METHODOLOGY AND IPR COURSES (RMC)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			CREDITS	SEMESTER
				L	T	P		
1.	MV5303	Research Methodology for Visual Media	RMC	3	0	0	3	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			CREDITS	SEMESTER
				L	T	P		
1.	MV5314	Industrial Project (Summer)	EEC	-	-	-	2	3
2.	MV5411	Dissertation	EEC	0	0	24	12	4

OPEN ELECTIVE COURSES (OEC)

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	MP5491	Nuclear Energy in Health Care and Industry	OEC	3	0	0	3	3
2.	MP5492	Smart Materials for Energy and Environment Applications	OEC	3	0	0	3	3
3.	EA5491	Climate Journalism	OEC	3	0	0	3	3
4.	EA5492	Digital Photography	OEC	3	0	0	3	3
5.	AC5491	Green Chemistry	OEC	3	0	0	3	3
6.	AC5492	Food Chemistry	OEC	3	0	0	3	3
7.	AG5491	Natural Hazards and Management	OEC	3	0	0	3	3
8.	AG5492	Ocean Resources and Exploration Techniques	OEC	3	0	0	3	3
9.	MC5491	Basic Crystallography and Crystal Growth	OEC	3	0	0	3	3
10.	MC5492	Nonlinear Science	OEC	3	0	0	3	3
11.	MT5491	Statistical Methods	OEC	3	0	0	3	3
12.	HS5491	Professional Email Communication	OEC	3	0	0	3	3
13.	HS5492	Project Report Writing	OEC	3	0	0	3	3
14.	HS5493	Basic Presentation Skills	OEC	3	0	0	3	3

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AUDIT COURSES (AC)
Registration for any of these courses is optional to students

SL.NO	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	AX5091	English for Research Paper Writing	2	0	0	0	1/2
2.	AX5092	Disaster Management	2	0	0	0	
3.	AX5093	Sanskrit for Technical Knowledge	2	0	0	0	
4.	AX5094	Value Education	2	0	0	0	
5.	AX5095	Constitution of India	2	0	0	0	
6.	AX5096	Pedagogy Studies	2	0	0	0	
7.	AX5097	Stress Management by Yoga	2	0	0	0	
8.	AX5098	Personality Development through Life Enlightenment Skills	2	0	0	0	
9.	AX5099	Unnat Bharat Abhiyan	2	0	0	0	
					Total Credits:	0	

SUMMARY

S.No.	M.Sc. MULTIMEDIA (specialization in VISUAL COMMUNICATION) (TWO YEARS)					
	Subject Area	Credits Per Semester				Credits Total
		I	II	III	IV	
1.	PCC	23	18	12	00	53
2.	PEC	00	03	06	03	12
3.	RMC	00	00	03	00	03
4.	OEC	00	00	00	03	03
5.	EEC	00	00	02	12	14
6.	AC	✓	✓	00	00	00
TOTAL CREDIT		**23**	**21**	**23**	**18**	**85**

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MV5101   **SCRIPT WRITING AND STORY-BOARDING**   **L T P C**
                                                                    3 0 0 3

OBJECTIVES
- To impart knowledge on news reporting.
- To learn the art of script writing.
- To understand how to communicate through broadcast media.
- To identify best practices for script writing and story-boarding.
- To be informed of laws and ethical practices in the media industry.

UNIT I   WRITING   9
News story format – Inverted pyramid structure – 5Ws and 1H – Captions: A picture is worth a thousand words – Writing headlines – news writing and copy editing – Producing copy – Checklist for copy preparation – Basic sentence structure – Writing under pressure – Writing for your listener – Writing for your announcer – Leads for broadcast services – Body of a broadcast news story – Updating broadcast news stories – Editing copy – Putting together a newscast – Newsroom environment – Checklist for broadcast news writing – Story structure – Long stories and series – Broadcast news writing, shorter is better – Editorials – Writing point-counterpoint articles for the editorial page – In-house journals, manuals, pamphlets – writing for the internet – news portals.

UNIT II   IDEATION   9
Concept creating (knot)– product based story writing – documentary based story writing – commercial based story writing - story telling(narration) – budget planning – production scheduling - Scriptwriting – one line script writing (screenplay / dialogue) – storyboard drawing.

UNIT III   SCRIPT WRITING   9
Identifying suitable story concept/idea – Anatomy of a Screenplay - Beginning/middle/ end elaborating and breaking up the selected concept into scenes - Elaborating individual scenes – Slug line - Action – Dialogue - Creating a detailed script / screenplay.

UNIT IV   STORY-BOARDING   9
Sketching the characters' personalities/ costumes/ poses – Sketching the features of backgrounds / exteriors or interiors of buildings in different perspectives – Developing sketches of props /accessories/ weapons/ vehicles - Improvising these sketches with respect to the theme – Pairing and synchronizing dialogue with digital images – Writing the actions of each board to complement the digital images – Indicating placement of sound effects and original music.

UNIT V   LAW, ETHICS AND IPR   9
Information Technology Rules, 2021 – Intellectual Property Rights and patent law in India – Article 19(1)(a) – Freedom of the press and restrictions -- Right to Information Act, 2005 – Digital media guidelines and policies – Cyber laws in India – Media Council – Rights and responsibilities.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the nuances of writing for various media.
- Efficiently develop and write scripts for fictional programmes and non-fictional programmes.
- Use various commercial software for script and screenplay, etc.
- Prepare storyboards.
- Understand the legal and ethical aspects of the media.

REFERENCES
1. David Harland Rousseau and Benjamin Reid Phillips, Story-boarding Essentials: SCAD Creative Essentials (How to Translate Your Story to the Screen for Film, TV, and Other Media), Watson-Guptill, 2013.

2. Ed Gaskell, Make Your Own Hollywood Movie: A Step-by-Step Guide to Scripting Storyboarding, Ilex Press, 2004.
3. Francesca Banting, Your Life as A Movie: Scripting and Producing Your Dreams Into Reality, Createspace Independent Pub, 2015.
4. Hart, John, The Art of the Storyboard: A Film-makers Introduction, Second Edition, Focal Press, 2007.
5. Sergio Paez, Anson Jew, Professional Storyboarding: Rules of Thumb, Routledge 1 edition (6 February 2013.
6. M. Neelamalar, Media Law and Ethics, Prentice Hall India Learning Private Limited, 2009.

MV5102	USER EXPERIENCE DESIGN	L	T	P	C
		3	0	0	3

OBJECTIVES
- To identify the users and learn various methods to collect user behaviour data.
- To develop a deep understanding of business-centred design.
- To create efficient prototype to communicate and validate the design definition.
- To apply UX process to web, mobile and small screen device.

UNIT I   INTRODUCTION TO DESIGN & CONCEPTUALIZING UX   9
Introduction to Design - Design Research, Importance of Visual Design, Understanding the importance of Usability, Accessibility and Interaction, Psychopathology of Everyday things -- Human Centred design, Fundamental principles of interaction, Psychology of everyday things – Introduction to UX – Understanding UX lifecycle & flow of events – its importance and future, Elements of UX, Fundamental of User Experience (UX), Customer Experience (CX), Customer Digital Touch Points, User Interface Design (UI), Interaction Design (IxD), Human computer interaction (HCI).The effects of good UXD design, Flow and Interaction, Guiding principles – Fundamentals of business centered design & User centered design – Defining Information design and Interaction design.

UNIT II   USER RESEARCH TECHNIQUES   9
Need for data collection & prototyping – Different methods of data connection - User interview, Contextual enquiry, Heuristic Review, Survey, Empathy Map, Focus group, Research basics, User group definitions, Research techniques, Research analysis. Information Architecture Types of Navigation, Card sorting, Reverse card sorting, Sorting Tools& data analysis – Person creation – Preparing task list – Writing user story, Information Architecture & use cases.

UNIT III   WIREFRAMING, PROTOTYPING & USER TESTING   9
Wireframe & Prototyping : Low fidelity wireframes, Hi fidelity wireframes, Wireframes tool (Balsamiq/Sketch), Prototype tool (Adobe XD, InvisionApp), Annotating essentials, Wireframing essentials, Toolkits, Responsive design, Wireframes vs Prototypes, Mocktypes – Fundamentals, Design & method of usability testing, usability metrics, Fundamentals of field testing – Remote usability testing – Preparing test flow, questionnaire, scenarios with tasks list, recruiting participants - Heuristic analysis

UNIT IV   UX FOR MOBILE & SMALL SCREEN DEVICES   9
UX for mobile devices – Understanding the small screen environment – Prototyping for mobile devices – Usability testing & heuristic for mobile device – Experience definition for multiple platforms & form factor – Designing for the small screen.

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UNIT V BASICS OF HTML5 & CSS3 9

Fundamentals of HTML – attribute types – list – Hyperlinks – tables and its tags – form attribute – Adding Multimedia Contents using different media-related software and adding graphics – Introduction to CSS – Styles: Background, Text, Font, Link, Lists, Tables, Border – The box model: Styling with content, padding, borders and margin. CSS Positioning: static, relative, and absolute – using margins to separate and position.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student will be able:
- To understand the UX principles.
- To differentiate between businesses-centred design and user-centred design.
- To understand testing scenarios for usability.
- To understand the prototyping for mobile and small screen devices.
- To design and develop content for different screen resolutions

REFERENCES

1. Don Norman, The Design of Everyday Things, Basic Books, 2013.
2. Dan Saffer, Designing for interaction, New Riders publications, 2010.
3. Steve Krug, Don't Make Me Think! A Common Sense Approach to Web Usability, Second Edition, New Riders publications, 2006.
4. Ted Roden. Building the Real-time User Experience: Creating Immersive and Interactive Websites, Shroff/O'Reilly, 2010.
5. Christian Kraft. User Experience Innovation: User Centred Design that Works, Apress, 2012.
6. Nan Guo, Helmut Degen and Xiaowen Yuan, UX Best Practices: How to Achieve More Impact with User Experience, McGraw-Hill/Osborne Media.
7. Tom Tullis and Bill Albert. Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics, Morgan Kaufmann Publishers, 2008.
8. Trevor van Gorp and Edie Adams. Design for Emotion, Morgan Kaufmann, San Francisco

MV5103	AUDIOGRAPHY AND VIDEOGRAPHY	L T P C
		3 0 0 3

OBJECTIVES
- To understand the evaluation of audio and video production.
- To inculcate the sense of production aesthetics in terms of sound recording, compositions, and continuity.
- To gain knowledge of studio equipment usage and benefits.
- To understand the various equipment available for production and the selection of equipment for different production requirements.
- To understand the various production techniques for audio recording.

UNIT I INTRODUCTION TO AUDIO AND VIDEO 9

History of video cameras – Audio recorders and production – Different formats and codec for video and audio – Features and functions of camera and microphones – Sound team – Sound preproduction – Pixel aspect ratio – Progressive and interlaced scanning – Screenplay writing.

UNIT II AESTHETICS OF PRODUCTION 9

Types of shots and camera angles – Scene strategies: Changing the line of action, creating a visual point of view, group interactions, moving through space and time, cheating on film – Visual Pre-production: Aesthetics of production, principles of continuity, closed and open frame – 5 Shot rule – Pick-up patterns of microphone – Types of the lens – Types of camera mounting equipment – Understanding Sound – Frequency (Pitch), Amplitude (Loudness), Quality (Timbre), and Velocity – Different types of camera movements.

UNIT III COMPOSITION TECHNIQUES 9
5 – Cs of cinematography – Three tools for pre-visualization – Effective Picture Making: Composting the Picture – Practical Composition – Composition principles – The effect of the picture frame – Proportions, framing, pictorial balance – the emotional influence of tone – Colour impact and dynamic composition – Subjective and objective treatment.

UNIT IV FUNDAMENTAL OF LIGHTS AND SOUND 9
Components of sound: Dialogue, sound effects, automatic dialogue replacements, voice-over, Foley and music – Stylistic uses of sound: Sound Bridge, selective sound, and overlapped dialogue – Microphone techniques – The fundamental objectives of lighting, the sources of light, Three essential properties of light: Intensity, quality and colour temperature – Light and directionality – Fundamental lighting setup and principles – Exterior lightings – Lighting approaches and styles – Finding the appropriate lighting – Strategy and usage of light meters.

UNIT V INTRODUCTION TO STUDIO ATMOSPHERE 9
Video and audio monitors – Colourscope – Crew roles and responsibilities – Types of audio production scenarios – Video and audio studio management –Sound Control Room and Production Control Room – Mono and Stereo Sound – Different genres of video programmes.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Know how to write a script for various genres of production.
- Make the selection of scanning, format, and codec based on the platform.
- Know which equipment would be more apt for the production.
- Follow ethical and social values while representing society in a good way.
- Handle the camera and related equipment with expertise.

REFERENCES
1. Cherrier, M. H., Voice &Vision: A Creative Approach To Narrative Filmmaking. Focal Press, 2018.
2. Katz, B., & Katz, R. A. Mastering Audio: The Art and the Science (2nd ed.). Focal Press, 2010.
3. Millerson, G. Television Production. Focal Press, 2001.
4. Owens, J., & Millerson, G. Video Production Handbook (6th ed.). Focal Press, 2017.
5. Albert Moran and Michael Keane, Television across Asia: Television Industries, Programme formats & Globalisation, Routledge Curzon, Taylor & Francis Group, 2004.
6. Belavadi Vasuki, Video Production, Oxford University Press, 2012.
7. Robert Musburger & Michael Ogden, Single-Camera Video Production, Focal Press, 2014.
8. Herbert Zettl, Television Production Handbook, 10th Edition, Wadsworth Publications, 2009.

MV5104	THEORIES OF VISUAL ANALYSIS	L T P C
		3 0 0 3

OBJECTIVES
- To understand the nature and purpose of visual analysis.
- To explore how to blend different types of approaches and useful tools with visual content.
- To understand different types of visual breakdown and theories related to it.
- To study the models for analysis.
- To understand different types of visual analysis and evaluations.

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UNIT I INTRODUCTION TO VISUAL ANALYSIS 9
Visual analysis: Definition and different perceptions – Methods of visual analysis – Scope of visual communication – Unit of analysis – Image analysis – Text, context, social practice in media.

UNIT II VISUAL AESTHETICS 9
Aesthetic theory – Perception theory – Representation theory, Theory of Visual Rhetoric – Cognitive theory – Visual Semiotic theory – Reception theory – Narrative theory – Visual Ethics theory – Visual Literacy theory - Sensual Theories – Gestalt and Constructivism.

UNIT III QUANTITATIVE APPROACH 9
Content analysis – definition – variables, values – result approaches – Reliability and Validity – Limitations and extension – Visual Rhetoric and Metaphor – Research Questions – Symbolism – Iconography.

UNIT IV VISUAL ANTHROPOLOGY 9
Visual anthropology approach: definition, need – Types of contextual information analysis – Models of analysis – Direct and indirect analysis – Representation analysis – Semiotic approaches – Social semiotic analysis, visual semiotics and applications.

UNIT V CRITICAL ANALYSIS AND EVALUATION 9
Critical analysis: Needs and purpose, perception and application – Evaluation: Textual analysis: Newspaper – Advertisement – Political ad – Television – Perceptual Theories: Semiotics and Cognitive.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the scope and limitations of visual media.
- Identify the range of approaches to visual analysis.
- Learn the different visual representation techniques and its applications.
- Learn to apply the theoretical and empirical tools of visual analysis.
- Understand the theories of visual analysis.
- Learn to analyze and evaluate visual content.

REFERENCES
1. Kenneth L. Smith, Sandra Moriarty, Keith Kenney, Gretchen Barbatsis: Handbook of Visual Communication: Theory, Methods, and Media, Routledge, London, 2005.
2. David Machin, Andrea Mayr, How to Do Critical Discourse Analysis: A Multimodal Introduction, Sage, 2012.
3. Per Ledin, David Machin, Doing Visual Analysis: From Theory to Practice, Sage,2018.
4. Giorgia Aiello, Katy Parry, Visual Communication: Understanding Images in Media Culture 1st Edition, Sage, 2020.

MV5105	PYTHON PROGRAMMING	L T P C
		3 0 0 3

OBJECTIVES
- To know the basics of algorithmic problem solving.
- To develop Python programs with conditionals and loops.
- To define Python functions and use function calls.
- To use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.

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UNIT I   INTRODUCTION TO COMPUTING AND PROBLEM SOLVING   9
Fundamentals of computing – Computing devices – Identification of computational problems – Pseudo codes and flowcharts – Instructions – Algorithms – Building blocks of algorithms – Introduction to Python programming – Python interpreter and interactive mode – Variables and identifiers – Arithmetic operators – Values and types – Statements.

UNIT II   CONDITIONALS AND FUNCTIONS   9
Operators – Boolean values – Operator precedence – Expression – Conditionals: If-else constructs – Loop structures/iterative statements – While loop – For loop – Break statement – Function call and returning values – Parameter passing – Local and global scope – Recursive functions.

UNIT III   SIMPLE DATA STRUCTURES IN PYTHON   9
Introduction to Data Structures – List – Adding items to a list – Finding and updating an item – Nested lists – Cloning lists – Looping through a list – Sorting a list – List concatenation – List slices – List methods – List loop – Mutability – Aliasing – Tuples: creation, accessing, updating, deleting elements in a tuple, tuple assignment, tuple as return value, nested tuples, basic tuple operations – Sets.

UNIT IV   STRINGS, DICTIONARIES, MODULES   9
Strings: Introduction, indexing, traversing, concatenating, appending, multiplying, formatting, slicing, comparing, iterating – Basic Built-In String Functions – Dictionary: creating, accessing, adding items, modifying, deleting, sorting, looping, nested dictionaries built-in dictionary function – Finding key and value in a dictionary – Modules – Module loading and execution – Packages – Python standard libraries.

UNIT V   FILE HANDLING AND EXCEPTION HANDLING   9
Introduction to Files – File path – Opening and closing files – Reading and writing files – File position – Exception: Errors and exceptions, exception handling, multiple exceptions – Case studies.

TOTAL: 45 PERIODS

OUTCOMES
On completion of the course, students will be able to:
- Develop algorithmic solutions to simple computational problems.
- Develop and execute simple Python programs.
- Write simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries etc.
- Read and write data from/to files in Python programs.

REFERENCES
1. John V Guttag, Introduction to Computation and Programming Using Python, Revised and Expanded Edition, MIT Press, 2013.
2. Charles Dierbach, Introduction to Computer Science using Python, Wiley India Edition, 2016.
3. Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Reema Thareja, Python Programming: Using Problem Solving Approach, Oxford University Press, 2017.

MV5111   **DRAWING LAB**   **L T P C**
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OBJECTIVES
To engage in the creative process or interpretive performance required for a visual artist.
- To understand how lines can be used to describe, model, or translate all of visual reality.
- To make students understand the principles of art.
- To introduce them to the basics of logo designing.
- To make them aware of the different styles of painting.

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UNIT I INTRODUCTIONTO DRAWING 12
The elements of art – Line – Horizontal, vertical, diagonal / slanting, zigzag, and curve shape & form – Geometric (square, circle triangle, rectangle, and oval); and Organic (Freeform), Space – Distance between, around, above, below and within things.

UNIT II PRINCIPLES OF ART 12
Balance – Formal, informal and radial, variety – Combining one or more elements to create interest by adding slight changes – Harmony – Blending elements, emphasis – Stand out, contrast, proportion – Relationship between two or more objects – Movement – Viewer's eye throughout the work – Rhythm – Repeating an element to suggest vibration, pattern – Unity, completeness.

UNIT III COLOUR AND COMPOSITION 12
Definition, Hue, Saturation and Brightness – Historical background – Additive and Subtractive colours – Theory of colours – Colour wheel – Warm and Cool colours – Primary, Secondary and Tertiary colours and the right combination of these colours for various purposes – Colour Symbolism and Psychology – Use of colours in painting, printing, creative production – Practice in different colour mediums and airbrushes – Composition, light and shade drawing.

UNIT IV TYPES OF DRAWINGS 12
Introduction to Chiaroscuro – Principle of perspectives – Linear perspective, Vanishing point perspective – One, two, and three-point perspective – Lines and different strokes using different pencils and brushes – Cartoons, caricature, scale drawing – The practice of birds, animals, and human forms – Portraits and self-portraits.

UNIT V HUMAN AND ANIMAL FORMS 12
The general form and gesture – Drawing from cast & figure light and shade, Basic Proportions, Balance – Standing still or motion – gravity and perspective, shape making – Basic Shapes and procedures – Study of eye, study of nose, study of ear and body – Importance of anatomy in animation.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Complete drawings that work on the basic principles of one and two-point perspective or linear perspective.
- Understand the vocabulary which relates to each of the major elements of art, line, shape, value, colour, and texture.
- Understand the principles of art.
- Grasp the basics of logo designing.
- Gain awareness of the different styles of painting.
- Visualize and start with landscape drawing and painting.

REFERENCES
1. Claire Watson Garcia, Drawing for the Absolute and Utter Beginner, Watson-Guptill, 2018.
2. Luca Botturi, Todd Stubbs, Handbook of Visual Languages for Instructional Design: Theories and Practices, Idea Group, 2008.
3. Mark Crilley, The Drawing Lesson, Random House, 2016.
4. Milind Mulick, Jyotsna Prakashan, Water Colour, Pune, 2001
5. Raviraj, A Grammar Book of Art & Design, New Century Book House Pvt Ltd, Chennai, 2008.
6. Wilbert Verhest, Sculpture Tool Materials and Techniques, Prentice-Hall, 2006.

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MV5112	**USER EXPERIENCE DESIGN LAB**	L	T	P	C
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OBJECTIVES

- To develop skills required for analyzing the usability of a website.
- To understand concept generation and its related field of study.
- To impart the skills required to create an information architecture document needed for a website.
- To explore website and mobile application analysis.
- To establish the requirements for User Experience Concept Designing using techniques such as use cases, personality development and task description.

UNIT I   WEBSITE AND MOBILE APPLICATION ANALYSIS   12

The students must select different types of websites and analyze them critically using design principles. The report has to be generated for each of the websites and an analysis of the result should be made. The course delivers an understanding of the important features present on a website. In the same way, the mobile applications are to be chosen in different categories and the results should be summarized. In the end, students learn how to use and implement the design principles in websites and mobile applications.

UNIT II   CONCEPT GENERATION & FIELD STUDY   12

Generating a new concept for the project. It can be a product/website/mobile application. After generating the concepts, the students should do the user research (Identifying user research methods, planning for field visits, understanding users, preparing the questionnaire, task list, and designing for users) and prepare the wire-framing based on preliminary research and present it to the course instructor.

UNIT III   PERSONA CREATION AND DATA ANALYSIS   12

Creating personas and scenarios, Creating user stories, red routes, and user journey maps, Applying interaction design principles.

UNIT IV   DESIGNING INTERFACE AND PROTOTYPING   12

Designing the information architecture – Design for network effects, pattern libraries and social patterns – Designing Interfaces and wireframes, UX prototyping.

UNIT V   USABILITY TESTING & EVALUATION   12

The student will do the usability testing/ heuristic analysis for the project they have undertaken and after the necessary corrections are made, the final product/ website/mobile application will be submitted to the course instructor. The student must use HTML & CSS support for the completion of final product development.

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student will be able to:

- Identify the users and learn the user experience lifecycle in its entirety.
- Develop a deep understanding of business-centred design.
- Create an efficient prototype to communicate and validate the design definition.
- Apply UX process to mobile and small screen devices.
- Develop a prototype.
- Test the usability of the developed design.

SOFTWARE

- Adobe XD, Figma, Adobe Dreamweaver

REFERENCES

1. Christian Kraft, User Experience Innovation: User-Centered Design that Works, Apress, 2012.
2. Craig Grannell, The Essential Guide to CSS and HTML web design (Essentials), Friends of ED publishers 2008.

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3. Dan Saffer, Designing for Interaction, New Riders Publications, 2010.
4. Don Norman, The Design of Everyday Things, Basic Books, 2013.
5. Ted Roden, Building the Real-time User Experience: Creating Immersive and Interactive Websites, Shroff O'Reilly, 2010.
6. Tom Tullis and Bill Albert, Measuring the User Experience: Collecting, Analysing and Presenting Usability Metrics, Morgan Kaufmann Publishers, 2008.
7. Trevor Van Gorp and Edie Adams, Design for Emotion, Morgan Kaufmann, San Francisco, 2012.

MV5113	PHOTOGRAPHY LAB	L T P C
		0 0 4 2

OBJECTIVES

To create opportunities for professional and creative expression through the art of photography.

- To understand and explore photojournalism.
- To understand the genres of photography
- To study different types of lighting techniques.
- To inculcate students with the aesthetic sense that is involved in creativity.

UNIT I   INTRODUCTIONTO PHOTOGRAPHY   12

Students practise using fully manual SLR and DSLR cameras to learn camera focus. They also use semi-manual modes like shutter and aperture priority mode, to practise exposure, Depth of field, and focal length.

UNIT II   COMPOSITION   12

Students practise the use of Monochromes and colours to understand contrast, texture, pattern, shapes, and perspectives. They also learn Framing and Composition with different shots and camera angles in DSLR.

UNIT III   LIGHTING   12

Practising in available light on select themes. Use of different metering modes and manipulation of light to create different moods. Concentrating on assignments based on the use of colours in photography. Use of reflectors and diffusers – Practice in various patterns of lighting for portraits, self-portraits and other genres.

UNIT IV   PHOTO JOURNALISM   12

Covering news events inside the campus based on different news elements to practise for photojournalism.

UNIT V   GENRES OF PHOTOGRAPHY   12

Practice in fully manual and semi-manual modes for capturing sports events and moving objects. Practice in social themes and selected genres of photography like product photography.

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student will be able to:

- Learn the principles of good composition in photography.
- Create new lighting strategies.
- Compose the perfect shot in photography.
- Develop an individual style of representing society through photographs.
- Take photographs covering all the different genres in photography.
- Build their photography portfolio.

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REFERENCES
1. Bernhard J Suess, Creative Black and White Photography, Allworth Press,2013.
2. Bryan Peterson, Understanding Exposure, Amphoto Books, 2009.
3. Christopher Grey, Master Lighting Guide for Portrait Photographers, Amherst Media, 2004.
4. Dan Simon, Digital Photography Bible, Wiley Publishing, 2004.
5. Michael Busselle and David Wilson, The Perfect Portrait Guide, Rotovision, 2002.
6. Scott Kelby, The Digital Photography Book, Peachpit Press, 2014.

MV5114	AUDIOGRAPHY AND VIDEOGRAPHY LAB	L T P C
		0 0 4 2

OBJECTIVES
- To gain knowledge on studio equipment usage and its benefits.
- To understand video and audio recording knowledge for various production techniques.
- To inculcate an aesthetic sense in audio and video production.
- To learn about different video and radio programming formats.
- To provide a clear understanding of video and audio studio setups.

UNIT I   BASICS OF AUDIO AND VIDEO   12
Practice with semi-professional video camera, Video switcher, Teleprompter, Audio switcher. Setting up the studio for video and audio production, Practice with camera format settings, Image control settings. Practice with wired and wireless microphones, setting up microphone – Synchronizing, sensitivity, pickup patterns, and audio decibels. Activities related to scriptwriting.

UNIT II   HANDLING VIDEO AND AUDIO EQUIPMENT   12
Practice with various mounting equipment – Practise with shot, angle, and composition – Assignment on in-camera editing – Understanding progressive and interlaced scanning methods – Practice on continuity – Mise-en-scene – Sound performance, actions and placement, 180 degrees and 30 degrees. Practising on-screen strategies – Activities on pre-visualization.

UNIT III   PRACTISING   12
Practice with types of camera angles – Objective, Subjective and Point-of-view – Assignment to understand bridging time & space – Assignment on audio interview – How to cheat with a location (Chroma Key).

UNIT IV   LIGHTING   12
Lighting setup for indoor and outdoor – Three-point and five-point lighting setup – Practising with various styles of lighting setup – Understanding the concept of colour temperature and how to bounce natural light – Light setup of blue or green screens.

UNIT V   MASTERING   12
Produce programmes for various platforms like social media, television, radio, commercial and corporate videos.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Recognize the principles of production techniques.
- Practice with different types of shots, angles, and compositions.
- Practice with different types of microphones and audio equipment.
- Practice on various genres of production.
- Gain expertise in creating sound effects and live audio recordings.
- Produce socially responsible programmes to create change in society.

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SOFTWARE

- Audacity, Adobe Final Cut Pro.

REFERENCES

1. Cherrier, M. H. Voice & Vision A creative approach to narrative film-making. A Focal Press, 2018.
2. Katz, B., & Katz, R. A. Mastering Audio: The Art and the Science (2nd ed.). Focal Press, 2010.
3. Millerson, G. Television Production. Focal Press, 2001.
4. Owens, J., & Millerson, G. Video Production Handbook (6th ed.). Focal Press, 2017.
5. Albert Moran and Michael Keane, Television across Asia: Television Industries, Programme formats & Globalisation, Routledge Curzon, Taylor & Francis Group, 2004.
6. Belavadi Vasuki, Video Production, Oxford University Press, 2012.
7. Robert Musburger & Michael Ogden Single-Camera Video Production, Focal Press, 2014.
8. Herbert Zettl, Television Production Handbook, 10th Edition, Wadsworth Publications, 2009.

MV5201	DIGITAL ART	L T P C
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OBJECTIVES

- To acquire knowledge on various art traditions.
- To learn about the fundamentals and principles of digital art.
- To be familiarized with concepts of colours and perspectives.
- To express ideas in the form of creative digital art.

UNIT I INTRODUCTION TO ART AND ITS TRADITION 12

Art in our world: Art, the language of art, artists' creation – Art theory: Imitationalism, formalism, emotionalism, art criticism and aesthetic judgment – Learning from a work of art – Art criticism – Aesthetics – Art history – Reading art like literature – Art traditions from around the world – Art of ancient times – Middle Eastern and Asian art – African Art – Art of the Americas – Architecture – Transitions in Western art – Modern art – Twentieth-century art – New media animation.

UNIT II DIGITAL MEDIUM 12

The media and processes of art – Two-dimensional media – Three-dimensional media – Technological media – Creative Process – Physiology and psychology of creativity – Problem-solving – Creative process in self-expression – Executing effective digital art – Computer/software operations – File management – Graphics editing, graphics software – Drawing– Introduction to human figures – human anatomy, gestures and poses – Tracing using digitizer tablets – Networks, Servers, file management – Image acquisition: Digital capturing – Digital photography – Photographic tools for colour correction, photo retouching and repair.

UNIT III ELEMENTS AND PRINCIPLES OF ART 12

Elements of art: line, shape, form, space, colour, value, texture – Principles of art: contrast, balance, proportion, movement, rhythm, variety, emphasis, unity – Creating a composition – Combining elements of art – Applying principles – Mixed media techniques – Composite techniques – Mixing various electronic media – Paper types and presentation – Line/ drawing skills – Contour drawing – Thumbnail sketches & storyboards – Perceptual skills of drawing – The perception of edges – The perception of spaces – The perception of relationships – The perception of lights and shadows –Gestalt theory of visual perception.

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UNIT IV COLOUR AND PERSPECTIVES 12

Colour Theory – Psychology of seeing colour – Physiology of colour – Colour vocabulary – Colour models – Digital primaries (RGB) – Print primaries (CYMK) – Pigment primaries (RBY), Typography – Historical development of typography – Categories of type – Vocabulary – Selecting typefaces and fonts – Specifications – Illuminations with type – Perspective one-point – Two-point – Three & four-point electronic techniques for creating the illusion of depth – Value study portraits – Shaded geometric forms – Grayscale value techniques – Gradient tools with digitizer tablets.

UNIT V TYPES OF DIGITAL ART 12

Figure-drawing studies of the human form – Face and body proportions – Using digitizer tablets and various graphics software – Landscape on-location sketches – Use of electronic media for final work – Figurative, abstract, landscape, Still-life – Utilize knowledge of composition – Observation of actual objects – Stylus & tablet techniques.

TOTAL: 60 PERIODS

PRACTICALS
1. Create logos with shapes and effects
2. Create different print collaterals using computer graphics tools
   (Visiting card, letter head, brochure, pamphlets, danglers, leaflets, posters, book cover, CD cover, greeting cards and other printing materials, etc.)
3. Product cover design
4. Package cover designing
5. Designing an invitation
6. Editing photographs with effects and colour correction
7. Collage works with photographs
8. Developing graphic backgrounds and layouts
9. Designing 3D buttons, menus
10. Designing a web page
11. Creating and designing newsletter
12. Designing a calendar
13. Designing a print advertisement for newspapers and magazine.

OUTCOMES
At the end of the course, the student will be able to:
- Acquire knowledge of art traditions.
- Understand the fundamentals of digital art.
- Imbibe digital art principles.
- Create and express ideas through various forms of digital art.

REFERENCES
1. Judith Aron Rubin, Approaches to Art Therapy: Theory and Technique, Routledge, 2016.
2. Joseph A. Gatto, Albert W. Porter, and Jack Selleck, Exploring Visual Design: The Elements and Principles, Davis Publications Inc., U.S, 2000.
3. Christian Leborg, Visual Grammar. A Design Handbook, Princeton Architectural Press, 2006.
4. Patti Mollica, Color Theory: An Essential Guide to Color from Basic Principles to Practical Applications, Walter Foster Publishing, 2013.
5. Sophie Cure and Barbara Seggio, Graphic Design PlayBook: An Exploration of Visual Thinking, Laurence King Publishing, 2019.

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MV5202   **2D ANIMATION**   **L T P C**
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OBJECTIVES
- To understand and get familiarized with the principles and theories of animation.
- To incorporate basic animation techniques and concepts covered in films.
- To understand the scripting language and its uses.
- To produce exercises as well as a final project in animation using Flash software.
- To develop interactive animations.

UNIT I   GRAPHICS AND ANIMATION   9
Introduction to Computer graphics – Application of computer graphics – coordinate systems – Basic terms: pixel, resolution, screen size, aspect ratio, raster and vector graphics, frame rate, file formats and resolution – Introduction to animation – Animation Techniques – Basic factors affecting the illusion of motion – Introduction to 2D animation software interface: Basic drawing and painting tools – Shading techniques: Working with colours, strokes and fills, drawing for animation based on observation, memory, and imagination, creating and modifying vector objects.

UNIT II   ANIMATION PRINCIPLES AND FORMATS   9
Principles of animation, colour theory – Perspective in animation – Basic human anatomy: body, motion, and posing, animal study – laws of physics for animation: the law of motion, body mechanics, particles, rigid body, waves, electrostatics, Electromagnetics, thermodynamics -- Frame-sequencing features: Frame by frame animation, Tween animation – Masking: Text, image, static and dynamic mask – Styles in animation: Visual styles: Indian, Disney, American, Russian and Japanese Style, Storytelling style. Introduction to the equipment required for animators: The animator's drawing tools, the animation table.

UNIT III   ANIMATION PRODUCTION AND FILM-MAKING PROCESS   9
Animation Production pipeline: Pre-production, Production and Post-production – Animation film-making process – Exploring ideas: Storytelling and scriptwriting – Concept art and camera map, shot description based on length, angle and movement, thumbnail storyboard, storyboards, Animatic boards – Clay animation and stop motion animation – Design: characters, backgrounds, environment, and props.

UNIT IV   FILM-MAKING TECHNIQUES OF 2D ANIMATION   9
Character construction – Expressions: Face, Hand, and other parts of the body – Character design: Personality, attitude, proportion, head height, silhouette – Music and sound effects, Lip sync, – Compositing, rendering, framing, transition, staging and continuity – Crossing the line, background and environment layouts – Distance and perspective – Focus of attention.

UNIT V   INTERACTIVE ANIMATIONS   9
Action Scripting: variables, data types, statements and expressions – Operators, decisions making statements, looping statements, functions, user interaction, text, styles and fonts, events and event handlers – Interactivity with the mouse and keyboard – Timers and time-driven programming – Multi-touch and accelerometer input – Error handling.

                                                                TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Use design principles and theories to produce animations.
- Plan and execute the production of animation films starting from concept creation to final output.
- Understand the history of animated films and different animation techniques.
- Learn about various film-making techniques.
- Incorporate interactivity using the scripting language.

REFERENCES
1. Francis Glebas, The Animator's Eye, Focal Press, 2013.

2. Keith Peters, Foundation Actionscript 3.0 Animation: Making Things Move!, Apress Media, 2007.
3. Paul Wells, Samantha Moore, The Fundamentals of Animation, Bloomsbury Publishing, 2016.
4. Russell Chun, Adobe Animate CC Classroom in a Book, Adobe Press, 2019.
5. Stephen Brooks, Tradigital Animate CC: 12 Principles of Animation in Adobe Animate, CRC Press. 2017.
6. Adobe Creative Team, Adobe Flash Professional CC Classroom in a Book, 2013.

MV5203	USER INTERFACE DEVELOPMENT	L T P C
		3 0 0 3

OBJECTIVES
- To describe the structure of the User Interface and the Design process.
- To develop the Web Interface and to organize the systems and control.
- To understand and create queries using SQL Language
- To learn about server controls and events in ASP.NET.
- To augment the knowledge on data Access with ADO.NET

UNIT I   INTRODUCTION TO USER INTERFACE DESIGN   6
Human-Computer Interface – Characteristics of Graphics Interface – Human Characteristics in Design – Web User Interface – Characteristics & Principles – Website: Information Architecture, user interface, site structure, navigation, layout, colours, and fonts – Elements of a good website design – Steps involved in creating a website: user needs, mock design, functional design, testing and implementation.

UNIT II   SCRIPTING LANGUAGE   9
Introduction to Scripting Language – different ways to incorporate JavaScript, Data types, Variables, Expressions, Operators, and Statements, Predefined Dialog Boxes, Map HTML elements using Document Object Model, Arrays – User-defined functions, Events, and Event Handling.

UNIT III   JAVASCRIPT – OBJECTS, ARRAYS, FUNCTIONS & VALIDATIONS   9
Predefined JavaScript Objects – String, Math, Array, Date, Function and Global objects. Form Validations, Browser Objects – Window, Document, Image, Form, Anchor, Location, and History objects.

UNIT IV   JQUERY   9
Introduction to jQuery, Syntax, Selectors, Events, Effects, HTML Traversing, AJAX. Introduction to jQuery mobile, mobile pages, transitions, buttons, icons, popups, toolbars, navbars, panels, Collapsibles, tables, grids, lists, forms, themes, events.

UNIT V   BOOTSTRAP & ANGULAR JS   12
Introduction to Bootstrap, Bootstrap Grids, Themes, Bootstrap CSS, Bootstrap JS, Introduction to Angular JS: AngularJS Expressions, Modules, Data Binding, Scopes, Directives & Events, AngularJS Controllers, Filters, Services, HTTP, Tables, Validation, API, Animations, i18n and i10n.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Describe the characteristics of Graphic Interface and its principles.
- Discuss the nature of the design process and its relation to other phases of the software development process.

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- Efficiently Create, update, retrieve and Manage data using SQL
- Comprehend.NET Framework and Windows Application.
- Connect with backend using ADO.NET.

REFERENCES
1. R. Elmasri S. B. Navathe, Fundamentals of Database Systems, Addison Wesley, 2015
2. Raghu Ramakrishnan, Database Management Systems, Mcgraw-Hill, 4th edition, 2015.
3. John Paul Mueller, Microsoft ADO.NET Entity Framework Step by Step, Microsoft Publishers, 2018.
4. Learning Angular JS: A Guide to Angular JS Development, By Ken Williamson, O'Reilly Media Inc. 2015.
5. Tom Tullis and Bill Albert. Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics, Morgan Kaufmann Publishers, 2008.
6. JavaScript and JQuery: Interactive Front-End Web Development Hardcover By Jon Duckett, Gilles Ruppert, Jack Moore published by John Wiley and Sons Inc. 2014.
7. jQuery Cookbook: Solutions & Examples for jQuery Developers By Cody Lindley, published by O'Reilly Media Inc. 2010.
8. Green and Brad, Angular JS, Orielly Media Inc, 2013.

MV5204	3D MODELING AND ANIMATION	L T P C
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OBJECTIVES
- To learn the basics of animation history.
- To understand the topology of the 3D model.
- To learn the basic physical properties of different 3D objects and its environment.
- To understand the various techniques involved in character movements.
- To inculcate editing and texturing skills.

UNIT I   UNDERSTANDING 3D   9
Defining 3D animation – Exploring the 3D animation industry – History and development of 3D animation – Understanding production pipeline – Idea, story, script and story-board – Animatic, pre-visualization, production pipeline – Layout, research, and development – Modeling – Texturing. Understanding digital imaging – Pixels – Vector images – Anti-aliasing –Basic graphic file formats – Channels – Colour depth or bit depth – Colour calibration – Understanding digital video, resolution – Device aspect ratio, safe areas – Interlaced and progressive scanning – Compression and file formats – Usage of the reference image in 3D

UNIT II   3D MODEL AND TEXTURING   9
Research for models – Understanding different objects with standard primitives – Human anatomy – Facial expressions – Vowels – Animation properties, basic poses – Character definition – Principles of animation. Understanding realistic renders – The recreation of real-life lighting in computer graphics – Usage of chrome ball – Usage of HDRI images – Render layers – Multi-pass rendering – Global illumination, indirect illumination – Importance of line flow for deformation and shape – Material creation -- Creating normal, maps.

UNIT III   RIGGING AND ANIMATION   9
Animation layer – Rendering layers – Creating Joint Bones – Constrains – Parent, Point, Scale and Aim orientation – Pole vector control – Creating Constrains using NURBS – Creating controls – Assigning controls – Binding skin –Skin Weights – Quick rig controls – Connection editor- Node graph editor – Key frame animation – Graph Editor – Deforms – Cluster.

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UNIT IV PARTICLES 9

Introduction to particles – Goal – Instancer – Soft body- Collider – Fluids – Ocean and Pond – Dynamic locator – Cloth – Texture properties – Hair – Follicles and texture – Modify curves – Transplant hair – Effects – Fire – Flow – Lighting – Smoke – Shatter - Emitter – Foam – Emission Region – Motion and kill field – MASH network and editor.

UNIT V RENDERING 9

Colour theory, Applying Colour theory in model, Adjusting material shaders – Multi-pass render – Multi-pass layering – Ambient occlusion – 3D paint tools – Beauty pass – Diffuse- Glow – Shadow -- UVW unwrapping – Refraction – UV pass – Arnold.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student will be able to:
- Gain an understanding of the basic 3D concepts.
- Understand how digital image works.
- Comprehend the basic movement of a character.
- Texture an object.
- Colour models efficiently by applying colour theory.

REFERENCES

1. King R., 3D Animation for the Raw Beginner Using Autodesk Maya 2e, CRC Press; 2019.
2. Ami Chopine, 3D Art essentials, Taylor & Francis 2012.
3. Sergio Paez& Anson Jew, Professional Storyboarding, Focal Press 2013.
4. Nancy Beiman, Prepare to Board (2nd edition), Focal Press, 2013.
5. Adam Watkins, 3D Animation: From Models to Movies, Charles River Media, 2000. Peter Ratner, Mastering 3D Animation Second edition, Skyhorse Publishing Inc, 2004.

MV5211	2D ANIMATION LAB	L T P C
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OBJECTIVES

- To appraise the knowledge and skills required to produce 2D animation sequences.
- To get acquainted with the 2D animation software.
- To get familiarized with the principles of mechanics, anatomy, and physics of animation.
- To impart the use of animation software in creating a range of productions.
- To create interactive animations.

UNIT I INTRODUCTION TO 2D ANIMATION 12

- Create frame-by-frame animations.
- Create cutout animations / Flip books / Stop motion animations.
- Create tween animations – Classic tween, Motion tween and Shape tween.

UNIT II PRINCIPLES AND STYLES IN ANIMATION 12

- Create animations that include all basic principles like bouncing ball, falling balloon, ball rolling on wooden ramp/coming to halt.
- Create a character and background design.

UNIT III MASKING 12

- Produce animations using static mask: text and image masking.
- Produce animations using dynamic mask: text and image masking.
- Produce animations for weighted object lifting, pushing, and pulling.

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UNIT IV   ANATOMY IN ANIMATION AND 2D ANIMATION FILM-MAKING   12
- Create animations involving anatomy: Character walk, run, pose.
- Animate various facial expressions and include Lip Sync, Sound, Audio effects.
- Create animations using 3D tools and IK bones.

UNIT V   INTERACTIVE ANIMATION AND ITS APPLICATIONS   12
- Create animated advertisements.
- Design and develop a web banner.
- Create animated PSAs, mobile applications.
- Action Script: Website.
- Action Script: Quiz / Interactive presentation.
- Animation portfolio.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Apply principles of mechanics and physics to animation.
- Develop an understanding of the tools used for creating 2D graphics and animation.
- Design 2D graphics, 2D character modeling and animation.
- Identify the fundamental skills acquired by creating and demonstrating an interactive presentation. Create a portfolio that meets industry expectations to showcase their artistic and technical achievements.

SOFTWARE
- Adobe Animate.

REFERENCES
1. Richard Williams, The Animator's Survival Kit: A Manual of Methods, Principles, and Formulas for Classical, Computer, Games, Stop Motion, and Internet Animators, 2012.
2. Preston Blair,Cartoon Animation (How to Draw and Paint Series), 1995.
3. Adobe Creative Team, Adobe Flash Professional CC Classroom in a Book, 2013.
4. Christopher Finch, The Art of Walt Disney, Abrams Publishers, 2011.
5. Frank Thomas, Ollie Johnston, The Illusion of Life: Disney Animation, 1981.
6. Dev Ramtal, Adrian Dobre, Physics for Flash Games, Animation and Simulations, Springer, 2011.
7. Sergio Paez & Anson Jew, Professional Storyboarding, Focal Press, 2013.

PROGRESS THROUGH KNOWLEDGE

| MV5212 | USER INTERFACE DEVELOPMENT LAB | L T P C |
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OBJECTIVES
- To develop skills required for analyzing the usability of various platforms
- To understand the concept of DBMS
- To understand and create queries using SQL Language
- To gain the knowledge of Dot Net Frameworks along with ASP.Net and C#
- To provide insights into the efficient usage of ADO.NET

UNIT I   USER INTERFACE DESIGN ANALYSIS   12
- Understanding and designing business with "requirement gathering".
- Designing Structure: Interaction design.
- Designing Structure: Information Architecture.
- Analyzing different types of websites and understanding the design principles of each user interface.

UNIT II   JAVASCRIPT   12
- Validate the website using Javascript objects
- Creating dynamic Calendar, Timestamp and Banner

UNIT III   JAVASCRIPT – OBJECTS, EVENTS   12
- Programmes related to event handling, Events, and Error handlings
- Programmes related to Window and Document objects.
- Design and Develop a professional interactive and dynamic website

UNIT IV   INTRODUCTION TO J Query   12
- Programs related to jQuery Selectors, jQuery Events, jQuery Effects, jQuery HTML, jQuery Traversing, jQuery AJAX, jQuery Misc.
- Programs related to jQuery-Mobile Pages, Mobile Transitions, Buttons, Mobile Icons, Mobile Popups, Toolbars, Navbars, Panels, Collapsibles, Tables, Mobile grids, Mobile lists, Mobile forms, Mobile themes, Mobile events.

UNIT V   BOOTSTRAP & ANGULAR JS   12
1. Programs demonstrating Bootstrap Basics, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, JS.
2. Programs related to AngularJS Expressions, Modules, Data Binding, Scopes, Directives & Events, Controllers, Filters, AngularJS Services, HTTP, Tables, AngularJS Select, Fetching Data from MySQL, AngularJS Validation, AngularJS API, AngularJS Animations, AngularJS i18n and i10n

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Define the fundamental terms and concepts related to web development
- Design and implement the database system with the fundamental concepts of DBMS.
- Write SQL statements that create database objects.
- Build Web Applications incorporating Controls in ASP. Net and Validating User Input.
- Integrate the developed front end web application with database.

SOFTWARE
- Oracle, Visual Studio

REFERENCES
- R. Elmasri S. B. Navathe, Fundamentals of Database Systems, Addison Wesley, 2015
- Raghu Ramakrishnan, Database Management Systems,Mcgraw-Hill,4th edition,2015
- John Paul Mueller, Microsoft ADO.NET Entity Framework Step by Step, Microsoft Publishers, 2018.
- Learning Angular JS: A Guide to Angular JS Development, By Ken Williamson, O"Reilly Media Inc. 2015.
- Tom Tullis and Bill Albert. Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics, Morgan Kaufmann Publishers, 2008.
- JavaScript and JQuery: Interactive Front-End Web Development HardcoverBy Jon Duckett, Gilles Ruppert, Jack Moore published by John Wiley and Sons Inc. 2014.
- jQuery Cookbook: Solutions & Examples for jQuery Developers by Cody Lindley, published by O'Reilly Media Inc. 2010.
- Green and Brad, Angular JS, Orielly Media Inc, 2013.

MV5213	**3D MODELING AND ANIMATION LAB**	**L T P C**
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OBJECTIVES
- To create a new model with standard primitives.
- To work with different 3D software.
- To understand the fundamentals of texturing.
- To learn the various techniques involved in modeling and texturing.
- To understand the various stages involved in the process of animation.

UNIT I   INTRODUCTION TO 3D   **12**
- Creating a basic model without editing standard primitives.
- Creating a model by editing standard primitive objects.
- Using Boolean expressions.
- Creating a Wireframe of a model.
- Sketching the model.
- Understanding the software interface.
- Understanding menu and tear-off menu.
- Working with shelves.
- Using channel box and attribute editor.
- Customizing the layouts.
- Working with tools.
- Working with transform, rotate and scale options.
- Creating a simple object using the standard object.

UNIT II   DEVELOPING 3D MODELS   **12**
- Creating a model using extrude, bevel, smooth.
- Creating T-Pose.
- Cleaning of mesh.
- Selecting multiple objects.
- Snapping the object.
- Creating and modifying the standard objects.
- Working with vertex, edge and face.
- Using extrude, bridge, chamfer, and cut face tool.
- Creating arc, line and square.
- Using smooth, curl, and bending curves.
- Creating different objects using the standard objects.
- Working with keyframe animation

UNIT III   INTRODUCTION TO TEXTURING   **12**
- Applying standard materials with colour.
- Applying external Image as texture.
- Applying materials and 2D textures.
- Mastering extra map options.
- Layering materials and textures.
- Using 3D textures.
- Using 2D and UV texture projection formats.
- Working with bump, normal, and displacement map.
- Texturing and customization of nodes.
- Working with utilities.
- Using paint effects.

UNIT IV   LIGHTING   **12**
- UV editing.
- UV unwrapping.
- Understanding colour.
- Linking and unlinking lights.
- Using depth maps.

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- Understanding Raytracing shadows.
- Using 1, 2 and 3 Point lighting.
- Applying different lights for the scene.
- Creating motion for the camera.
- Creating walkthrough for the camera.

UNIT V   FINALISING   12
- HDRI sources.
- Editing texture using the node editor.
- Creating particles for the scene.
- Modifying particles, gravity, push, and other particles.
- Creating human models, birds, and animal characters.
- Placing bones for the character.
- Understanding character weightage.
- Creating motion animation with rigging formats.
- Working with character motion.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the workspace of a 3D software.
- Develop creative 3D models.
- Apply relevant textures to 3D models.
- Apply the image as texture to 3D models.
- Skillfully edit texture using node editor.

SOFTWARE
- Autodesk Maya.

REFERENCES
1. Van Horn E., 3D Character Development Workshop: Rigging Fundamentals for Artists and Animators, Stylus Publishing, LLC, 2018.
2. Adam Watkins, 3D Animation: From models to Movies, Charles River Media, 2000.
3. Peter Ratner, Mastering 3D Animation, Second edition, Skyhorse Publishing Inc, 2004.
4. Nancy Beiman, Prepare to Board, (2nd edition), Focal Press, 2013.
5. Andy Beane, 3D Animation Essentials, John Wiley & Sons, Inc 2012.
6. King R. 3D Animation for the Raw Beginner Using Autodesk Maya 2e. CRC Press; 2019.
7. Sergio Paez & Anson Jew, Professional Storyboarding, Focal Press 2013.

PROGRESS THROUGH KNOWLEDGE

MV5301	2D GAME DESIGN AND DEVELOPMENT	L	T	P	C
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OBJECTIVES
- To explore the history of games and the gaming industry.
- To introduce the taxonomy of games.
- To familiarize students with issues, types, and techniques of computer game design.
- To explain the various phases in game development from the ideation stage to final finished game.
- To impart the practical and conceptual knowledge of game development along with the relevant theories behind game technology.

UNIT I   INTRODUCTION TO COMPUTER GAMES   9
Introduction to gaming – Game play, gamification – History of games, Game taxonomy – Emergent and progressive gameplay – Game thinking – Gaming industry –Theory of fun activity – Uses of game theory – Some applications and examples – Introduction to Android games and iOS games.

UNIT II   STORY AND GAMES   9
Concept of games as stories, narrative in video game presentation – Campbell's Monomyth theory – Types of games: FPS, role playing games, platform, racing, design elements – game elements: strategies, actions, outcomes, and payoffs – The normal form, pure strategy – Nash equilibrium, dominated strategies – Game culture, psychology and motivation – Planning and creating games: drawing the environment, creating your character.

UNIT III   GAME DEVELOPMENT PROCESS   9
Game design, teams and development processes: Game identification, terminology, storyboards, concepts, level design, modeling, interface design, development – Playtesting, planning and creating games: adding enemies, level design and adding basic enemy artificial intelligence.

UNIT IV   GAME SCRIPTING   9
Human-computer interaction (HCI) – Computer graphics, collision detection, lighting, and animation – Game scripting and programming – Game data structures and algorithms – Planning and creating games: defending and gaining score, energy.

UNIT V   GAME DEVELOPMENT WITH ENGINE   9
Anatomy of a game engine – Unreal development kit, Source SDK – Physics: Collision detection, particle systems, rigid body motion, deformable bodies – Animation and modeling: Keyframe animation, inverse kinematics, skinning, rendering, rasterization, scene graphs, spatial sorting – Level of detail, shader effects, sound synthesis – Gameplay: game worlds, object models, scripting – Artificial intelligence: pathfinding.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Describe the history of games and gaming industries.
- Describe and differentiate between different types of games.
- Demonstrate an understanding of the overall game design process.
- Design and implement basic levels, models, and scripts for games.
- Design and build their own functional game using game-engine.

REFERENCES
1. Dave Calabrese, Unity 2D Game Development, Packit Publishing, 2014.
2. Gary Rosenzweig, ActionScript 3.0 Game Programming University, Pearson, 2013.
3. Jeannie Novak, Game Development Essentials: An Introduction, Delmar Cengage Learning, 2012.
4. Mario Zechner and Robert Green, Beginning Android 4 Games Development, Apress, 2012.
5. Nikhil Malankar, Learning Android Game Development, Packt Publishing Ltd, 2017.
6. Patrick Alessi, Beginning iOS Game Development, John Wiley & Sons, 2011.

MV5302   **VISUAL EFFECTS**   L T P C
                                                                 3 0 0 3

OBJECTIVES
- To attain mastery of compositing tools.
- To enhance the video by adding a new set of elements.
- To understand the breakdown of visual effect shots.
- To understand the concept of motion capture and the related technologies.
- To learn different image matching and modeling.

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UNIT I   DEVELOPMENT OF VISUAL EFFECTS   9
A brief history of visual effects –Different types of compositing software –Introduction to layer and node-based software – Understanding the x and y-axis of footage – Types of footage – Working with HDRI footage – Animatics, storyboard and concept – Pipeline Introduction – Budgeting – Previsualization – Colour channels – Colour depth – Colour space – Aspect ratios – Resolution – File formats – Frames and time.

UNIT II   ROLE OF PRODUCERS   9
Global Animation and visual effects industry – Key players – Production workflow – Role of project manager – Technical director – Supervisor and line producer in visual effects field – Scheduling – Visual effects compositor checklist – Visual effects artist reference list – Asset maintain.

UNIT III   WORKING WITH EFFECTS   9
Working with special effects, visual effects and mechanical effects – Alpha channels, advanced selections – Level adjustments, extraction of grunge and grime maps – Steps in gathering light data, scanning properties – Characters and other set materials – Roles of visual effects supervisor, understanding the alpha value, working in stop motion and miniature – Motion capture and technology.

UNIT IV   IMAGE MATCHING   9
Rotoscope – Paint and wire removal – Anatomy and golden rule of tracking – 2D match moving – Types of modeling, model data, modeling production pipeline – Asset creation, environment building, simulation, particle systems – The workflow of digital lighting, tracking assets, camera tracking – Working with stock footage.

UNIT V   MERGING WITH 3D   9
Setting up a scene for the camera track and markers – 3D motion tracking –Using tracking markers – Interaxial separation, horizontal image translation, positive and negative parallax – Floating windows, energy and weapons, aesthetic scale – Creating 3D photography, pros and cons of 3D photography – Camera rig, multi-pass render, pixel displacement – 3D conversion, data workflow, real ID mastering – Concept of crowd multiplication, sky replacement – Global illumination and image-based lighting, rigid body dynamics, and rendering.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand visual aesthetics in films.
- Create new visual effects for their productions.
- Explore new technologies in the visual effects industry.
- Work with stereoscopic visual effect shots.
- Understand the role of a visual effects producer.

REFERENCES
1. Mitchell M, Visual Effects for Film and Television, Focal Press, 2013.
2. Okun JA, Zwerman S, The VES Handbook of Visual Effects: Industry Standard Vfx Practices And Procedures, Taylor & Francis, 2014.
3. Owen R, Failes I, Creating Visual Effects for Movies as a CGI Artist, United States: Ruby Tuesday Books, Ltd, 2017.
4. Failes, Ian, Masters of FX: Behind the Scenes with Geniuses of Visual and Special Effects, Focal Press, 2016.
5. Finance C, Zwerman S, The Visual Effects Producer: Understanding The Art and Business of VFX, Focal Press, 2015.

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MV5303	**RESEARCH METHODOLOGY FOR VISUAL MEDIA**	L T P C
		3 0 0 3

OBJECTIVES
- To understand the characteristics and scope of research.
- To explore new research techniques and methods.
- To understand data collection and analysis.
- To learn the statistical techniques required for analysis.
- To understand the processes and methods involved in research evaluation.

UNIT I   INTRODUCTION TO RESEARCH METHODOLOGY   9
Research: Definition and types – Scope – Ethics – Need for research – Problem identification – Objective formulation – Research design – Developing a research plan – Research gap – Research theories and models: Agenda Setting Theory, Reverse Agenda Setting Theory, Actor-Network Theory, Cultivation Analysis, Uses and Gratification Theory, etc.

UNIT II   REVIEW OF LITERATURE   9
Analysis of review of literature – Primary, secondary and web source – Critical literature review – Identifying gap areas from literature review – Research questions – Research methods.

UNIT III   QUANTITATIVE RESEARCH   9
Quantitative research methods: Need/aim/ scope – Types of data collection – Data collection techniques – Survey – Interviews – Questionnaire – Content Analysis – Statistical techniques/test – Data analysis with statistical packages – Interpretation and presentation of result.

UNIT IV   QUALITATIVE RESEARCH   9
Qualitative research: Need/aim/scope – Types: Observation, interviews, in-depth interview, focus group discussion – Semiotics – Frame analysis – Visual ethnography (including autophotography and photo elicitation) - Discourse analysis – Cultural studies – Multimodal and multi-sensorial research – Formative Research and Participatory research.

UNIT V   REPORT AND EVALUATION   9
Structure and types of report, technical report and dissertation, style manual, plagiarism – Citation and acknowledgement – Reproducibility and accountability.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the scope of the research.
- Use both quantitative and qualitative research methods.
- Carry out research in the fields of advertising, social media, journalism, communication, etc.
- Apply statistical techniques and tools.
- Write a research report.
- Take up independent researches.

REFERENCES
1. C.R. Kothari and Gaurav Garg, Research Methodology Methods and Techniques (3rd edition), New Age International Publishers, New Delhi, 2014.
2. Gerard Guthrie, Basic Research Methods: An Entry to Social Science Research, Sage, New Delhi, 2014.
3. Kultar Singh, Quantitative Social Research Methods, Sage, New Delhi, 2007.
4. Ranjit Kumar, Research Methodology: A Step By Step Guide for Beginners, Sage, Fourth Edition, New Delhi, 2014.
5. Roger D. Wimmer and Joseph R. Dominick. Mass Media Research: An Introduction (9th Edition), Thomson Wadsworth Publications, 2011.
6. Susanna Hornig Priest, Doing Media Research: An Introduction, Sage, New Delhi, 2009.
7. Luc Pauwels and Dawn Mannay, The Sage Handbook of Visual Research Methods, 2019.

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DATA ANALYSIS LAB   **L T P C**
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OBJECTIVES
- To learn the data acquisition, data cleansing, data analytics and visualization techniques
- To learn the method of doing various data analysis techniques
- To understand the various qualitative data analysis techniques
- To understand the importance of statistical models
- To learn social media analysis and other textual analysis formats

UNIT I   INTRODUCTION TO DATA ANALYSIS   12

Description of data – Various types of analytics – Popular analytical tools -- Data presentation – Creating tables and graphs -- Data visualization -- Infographics.

1. Understanding the importance of primary and secondary data
2. Working with sample primary and secondary data
3. Understanding the interface of statistics software and learning different tools
4. Creating survey form (questionnaire development)
5. Scale development process – Preliminary work
6. Understanding Samples & Population – Finding sample from population
7. Sample size determination
8. Identifying Sample error
9. Sample data collection (Pilot study)
10. Importing primary data
11. Data purification process
12. Understanding and cleaning outliers
13. Classification and tabulation
14. Frequency distribution, graphical representation

UNIT II   DESCRIPTIVE ANALYSIS   12

Understanding the different types of data and its use – Discrete data – Continuous data -- Measure of central tendency – Measures of dispersion – Skewness – Kurtosis.

1. Calculate mean for the given set of data using various methods for discrete and continuous data
2. Calculate weighted arithmetic average, harmonic mean, geometric mean and positional averages
3. Calculate median, quartiles and percentiles for the given data using different methods for discrete and continuous data
4. Calculate mode for the given data for discrete and continuous data
5. Calculate range, co-efficient of range, quartile deviation and co-efficient of quartile deviation, and mean deviation
6. Calculate standard deviation for the given data
7. Calculate variance for the given data
8. Calculate coefficient of variation
9. Calculate coefficient of skewness
10. Measure of Kurtosis

UNIT III   INFERENTIAL ANALYSIS   12

Types of hypotheses – Hypothesis testing — Understanding the importance of p Value – Types of inferential tests – Understanding parametric and non-parametric tests – Anova, t-test, 1 sample t-test, 2 sample t-test -- Goodness of fit, chi-square – Correlational analysis – Regression models, linear regression, multiple regression and logistic regression – Predictive model, split the data, model selection, multi-collinearity, predictions and quality checks -- Principal component analysis, Factor analysis, cluster analysis, discriminant function analysis.

1. Importing data and doing data purification process

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2. Understanding when to use what test, and assumptions
3. Data Normality testing using graphical and statistical methods
4. Analysis of Variance (ANOVA)
5. T-test
6. Chi-square test of independence
7. Correlational Analysis
8. Regression analysis (linear, multiple and logistic)
9. Factor analysis & its related tests
10. Cluster analysis
11. Discriminant analysis
12. Running different non-parametric tests

UNIT IV   TIME SERIES ANALYSIS AND STATISTICAL MODELS   12

Introduction to Predictive Models- Forecasting – Time Series Analysis – Introduction to various statistical models – Structural Equation Modeling (SEM) – its need and prerequisites

1. Time Series Analysis – Graphical method of measuring trends
2. Measuring trend values – Semi averages method, Moving averages method, Method of least squares
3. Calculating seasonal variation methods.
4. Importing data into the software and preparing it for the model development analysis using various options.
5. Preparing a model based on the theoretical framework
6. Test the model using software (exploratory and confirmatory factor analysis)
7. Reliability and validity testing
8. Using the same set of data and run the model using different software and understand the differences in the results
9. Path analysis.

UNIT V   QUALITATIVE DATA ANALYSIS   12

Understanding Qualitative Data – Qualitative Analysis – Managing data, Reading and annotating, creating categories, Splitting and splicing linking data, making connections – Of maps and matrices, Corroborating evidence, producing an account – Introduction to social media research – Analyzing Social Media Content using various software – Retrieving data and doing text analysis, cloud mapping, word art creation, sentiment analysis, network analysis.

1. Understanding qualitative data
2. Understanding the difference between deducting and inducting approach
3. Preparing coding sheets (wherever necessary)
4. Data cleaning and labeling
5. Creating framework for analysis
6. Doing content analysis, narrative analysis and discourse analysis
7. Analyzing structured and unstructured text
8. Analyzing audio and video formats
9. Quality checking using credibility, validity and reliability of content
10. Social Media data analysis (text analysis, cloud mapping, word art, sentiment analysis)
11. Network analysis

TOTAL: 60 PERIODS

SOFTWARE USED
Microsoft Excel, SPSS, AMOS, SMART PLS, R Studio, NVIVO

OUTCOMES
At the end of the course, the student will be able to:
- Perform data acquisition, data cleansing, and various aspects of data analytics and visualization.
- Use the principles of data analytics and its underlying methods and algorithms using various software.

- Do the different descriptive and statistical analysis
- Create scenically working models through statistics.

REFERENCES

1. James, G., Witten, D., Hastie, T., Tibshirani, R. An Introduction to Statistical Learning with Applications in R. Springer, 2013.
2. Nisbet, R., Elder, J., & Miner, G. Handbook of Statistical Analysis and Data Mining Applications, Academic Press, 2009.
3. Barbara M. Byrne.Structural Equation Modeling with AMOS, Taylor and Francis. 2011.
4. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 3rd ed. Thousand Oaks, CA: Sage, 2021.
5. Wilke, C. O. Fundamentals of Data Visualisation: A Primer on Making Informative and Compelling Figures. O'Reilly Media, 2020.

MV5312	**2D GAMING LAB**	**L T P C**
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OBJECTIVES
- To understand the 2D game design and development process.
- To understand the physics and mechanisms involved in the 2D game development process.
- To understand modeling, techniques, and scripting involved in the 2D game development process.
- To plan and create a 2D game using a game-engine.

UNIT I INTRODUCTION TO 2D GAMES ART 12
- Preparing a concept document.
- Developing game story, setting and characters.
- Developing key assets for games.
- Creating environment design.

UNIT II GAMEPLAY 12
- Developing gameplay.
- Design and create a traditional board game.
- Design and create a maze game.
- Design and create a puzzle game.

UNIT III GAME MECHANICS 12
- Implement the game mechanics (risk, reward, uncertainty, etc.).
- Design and develop an Egg Catcher game.
- Design and develop shooting game.
- Implement the level design.

UNIT IV GAME CONTROLS 12
- Implement game controls (movement, attack, power-ups, etc.).
- Design and develop platform games.
- Design and develop racing games.
- Design and develop role-playing games.

UNIT V ARTIFICIAL INTELLIGENCE 12
- Implement strategic decision making for opponent.
- Enemy AI.
- Design, develop and implement AI.
- Publishing for Desktop, Android, and iOS.
- Preparing a game design document.

TOTAL: 60 PERIODS

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OUTCOMES

At the end of the course, the student will be able to:
- Create the design of a game.
- Plan and develop the designed game.
- Work with game-engine.
- Design and implement basic levels, models, and scripts for games.
- Design and build fully functional games using game-engine.
- Design and develop different types of games.

SOFTWARE
- Adobe Animate, Unity.

REFERENCES

1. Dave Calabrese, Unity 2D Game Development, Packit Publishing, 2014.
2. Gary Rosenzweig, ActionScript3.0 Game Programming University, Pearson, 2013.
3. Jeannie Novak, Game Development Essentials: An Introduction, Delmar Cengage Learning, 2012.
4. Mario Zechner and Robert Green, Beginning Android 4 Games Development, Apress, 2012.
5. Nikhil Malankar, Learning Android Game Development, Packt Publishing Ltd, 2017.
6. Patrick Alessi, Beginning iOS Game Development, John Wiley & Sons, 2011.

		L	T	P	C
MV5313	VISUAL EFFECTS LAB	0	0	4	2

OBJECTIVES
- To understand the pipeline of visual effects.
- To study the new techniques involved in visual effects.
- To understand the working of visual effect shots.

UNIT I   INTRODUCTION TO TOOLSET   12
- Understanding the UI of software, viewer and metadata.
- Creating stick nodes and postage stamps.
- Working with tracking – single, double, four-point tracking – rotation and scaling.
- Understanding the x-axis and y-axis of footage.
- Stabilizing the running footage.
- Match moving the object to the footage and rendering.

UNIT II   RETOUCHING MOVING IMAGES   12
- Understanding and working with Rotoscoping.
- Bezier, B-splines, shapes, feather. Compositing with different footage using Roto.
- Exporting and importing the alpha channel.
- Retouching with Rotopaint.
- Working with wire removal shot.
- Creating and working with a clean plate.
- Working with graph editors.
- Understanding and working with the match move process.

UNIT III   KEYING AND PARTICLES   12
- Working with blue/green matte footage.
- Using different keyers – IBK colour, Key light, Chroma key, Alpha key; Create a garbage mask.
- Matching light space and adjusting for brightness and colour.

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- Copying channel and working with shuffle channel options.
- Adding noise in the live-action videos, Removing grain and dust.
- Creating and working with titles.
- Adding particles in compositing.
- Creating the digital crowd.
- Grading and colour correction.
- Time warping.
- Working with distorted images and videos.

UNIT IV   3D COMPOSITION   12
- 3D space in compositing.
- Creating multiple pass render.
- Working with camera tracking.
- Applying camera movement to a footage.
- Creating an external geometry.
- Importing camera data and normalizing it.
- Using HDRI images to light the source.
- Working with keyframes.
- Creating matte paint.
- Creating and merging the set extension objects to live-action.
- Matching lights and shadows.

UNIT V   SCRIPTING AND RENDERING   12
- Creating a depth map.
- Understanding the Z-depth.
- Compositing stereoscopic 3D.
- Working with particles.
- Creating particle simulation.
- Working with smart vectors.
- Understanding and working with deep compositing.
- Using python script to animate.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the visual appeal in the films.
- Create new visual effects for their production.
- Develop a 3D environment.
- Merge live-action footage with the visual effects.
- Simulate particle items.
- Code Python scripts for visual effect.

SOFTWARE
- Nuke.

REFERENCES
1. Dinur E. The Filmmaker's Guide to Visual Effects: The Art and Techniques of VFX for Directors, Producers, Editors, and Cinematographers. Focal Press, 2017.
2. Ganbar R. Nuke 101: professional compositing and visual effects. Peachpit Press, 2014.
3. Higgins S, North D, Monticone P, Rogers A, Polan D, Turnock J, Wright B, Overpeck D, Purse L, Dhir M, Allison T. Editing and Special/Visual Effects. Rutgers University Press, 2016.
4. Hornung E. The Art and Technique of Matchmoving: Solutions for the VFX Artist. Focal Press; 2013.
5. Lanier L. Advanced Visual Effects Compositing: Techniques for Working with Problematic Footage. Focal Press, 2017.
6. Lanier L. Aesthetic 3D Lighting: History, Theory, and Application. Focal Press, 2018.

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MV5314   **INDUSTRIAL PROJECT (SUMMER)**   **L T P C**
                                                                        - - - 2

The students shall undertake an internship for a minimum of four weeks in any media organization during the summer vacation (after the end semester examination of the second semester) and submit a consolidated report of the work done within a fortnight after the beginning of the third semester. The students will be evaluated based on presentation and oral examination.

MV5411   **DISSERTATION**   **L T P   C**
                                                                        0 0 24 12

OBJECTIVE

The main objective is to instill research interest in students and allow them to explore the various research techniques of multimedia. The students will carry out research under the guidance of a faculty member and submit a dissertation.

GUIDELINES FOR STUDENTS CHOOSING RESEARCH TOPIC

The students will be allowed to choose a research topic of their choice under the supervision of a faculty member. The topic should be related to multimedia/media studies. Interdisciplinary studies are allowed only if there is a multimedia/media element in the research topic.

RESEARCH PROJECT REVIEWS

The students will present before a screening committee to finalize the topic. This is followed by the first review to present their aim, objectives, scope, and need for the study, second review to present their review of literature and methodology, third review to present their findings before the research review panel. The review panel will be constituted by the Project Coordinator with approval of the Head of the Department. The review committee consists of the Supervisor, subject expert and Coordinator.

FINAL VIVA-VOCE EXAMINATION AND DISSERTATION SUBMISSION

The final evaluation will be an external evaluation, where the students will present their research findings through a presentation and also by submitting a dissertation. The students have to follow the Anna University guidelines for dissertation preparation. The external evaluator will be from another University / College and will be approved by the Head andthe Chairperson, Science and Humanities, Anna University. The student's dissertation will be scrutinized for plagiarism. Plagiarized works will not be considered for evaluation. The students are encouraged to present their research findings in conferences or publish their work in national / international journals with approval from their Supervisor.

OUTCOMES

At the end of the semester, the students will understand the importance of research, the need to employ research techniques and tools, and they will gain confidence to work in a contemporary research area independently under guidance.

                                                              TOTAL: 360 PERIODS

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MV5001	AESTHETICS OF FILMS	L	T	P	C
		3	0	0	3

OBJECTIVES

- To understand the functions of cinema as an institution for production and distribution of social knowledge and entertainment.
- To expose students to a variety of film styles, narrative conventions, visual styles, genres and analyze the dominant forms of popular cinema.
- To develop a critically informed sense of the history and development of film conventions, both mainstream and alternative.
- To impart knowledge on the historical development and cultural impact of film as an art form.
- To analyse the ideologies on ethics and social justice through representations of culture on film.

UNIT I   INTRODUCTION TO FILMS   9

Origins and Evolution of cinema – Nature of cinema – Critical and technical terms used in film production and practice – Industrial and economic basis of commercial cinema – Production, Distribution and exhibition of cinema – Film genres – Story archetypes, structure of a narrative – Narrative forms – Mise-en-scene – Film techniques, film form and conventions – Mainstream and alternative narratives and film forms – Film analysis techniques – Mobile film-making.

UNIT II   FILM THEORIES   9

Ideology in films – Authorship in films – Auteurs film theory – Director as "Author" – Structuralism film theory – Marxist film theories – Feminist film theories – Genre theory, Psychoanalytical film theory – Formalist film theory and other theories.

UNIT III   WORLD CINEMA   9

Introduction to world cinema – Film movements from Soviet, France, Germany, Italy, Korean etc. – Hollywood and its history – Convergence and films production, distribution and consumption in digital era.

UNIT IV   INDIAN CINEMA   9

Introduction to Indian cinema – Cinema as a source material for History – Nationalism and Indian cinema – Rise of the Indian film industry – Hindi films versus other regional language films, structure of Indian Films – Popular and award winning Directors and their works – National award winning movies – Role of archives, film festivals and other institutions in the field of cinema – Trends in the film industry.

UNIT V   TAMIL CINEMA   9

History of Tamil cinema – Cinema as an institution – Cinema as popular culture – Influence of cinema on social, cultural economic, political milieu in India and Tamil Nadu – Understanding audiences – Censorship and regulation of films – Need for media literacy in society.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student will be able to:

- Demonstrate a broad knowledge on film history, world cinemas and national cinemas.
- Understand, analyze, and critically evaluate films using various theories for its aesthetic as well as cultural constructs.
- Recognize the social, economic, and technological factors that shape films from different historical periods, ideological perspectives and cultural contexts.
- Apply critical thinking and aesthetic judgment in the analysis of fiction and non-fiction film, experimental and mainstream cinema, feature and short form narratives.
- Demonstrate their understanding of the critical and technical language associated with film studies.
- Understand how films as a cultural force, intersect with religion, politics, race, gender, values, and globalization.

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REFERENCES
1. Andrew Dix, Beginning Film Studies, Atlantic Publishers, U.S.A., 2010
2. Baskaran, TS, History through Lens-Perspectives on South Indian Cinema, Orient Blackswan Private Limited, Hyderabad, 2009.
3. Dissanayake, W, Rethinking Indian Popular Cinema: Towards Newer Frames of Understanding, Routledge, London, 2003.
4. Gokulsing KM, Dissanayake W, editors. Routledge Handbook of Indian Cinemas. Routledge, 2013.
5. Grieveson Lee, Film & Media Studies, University of California Press, 2018.

MV5002	MEDIA MANAGEMENT	L	T	P	C
		3	0	0	3

OBJECTIVES

- To develop an understanding of the overview of media management.
- To introduce the various concepts, process, theories and terms of media management.
- To develop knowledge in human resource and financial management in media business
- To identify the various content/programming strategies, importance of audience research and its implication in media management.
- To prepare professionals interested in careers in media management, advertising, marketing, promotions, managerial jobs, or for individuals in the field.

UNIT I   INTRODUCTION TO MEDIA MANAGEMENT   9

Media Management – Definition, history, scope. Different types of media and its exclusive features – Print, electronic and digital media. Understanding the different terms of media management – Overview of print, electronic and digital media industry and its role in media management –Understanding the management setups in different media houses – Levels of management function – Management roles - Skills required for various levels of media management team –- Functions of media management – Strategies of media management – Ethical aspects to be followed in media management.

UNIT II   MEDIA MARKET PLACE AND THEORIES OF MANAGEMENT   9

Management as process – Understanding the media market place – Media market, market structure, forces affecting markets, alliances and partnerships, implications. Theories: Classical school of management – Administrative management – Bureaucratic management – Human relations school of management – Maslow's Hierarchy of Needs – Herzberg's hygiene and motivator factors' theory x & theory y, theory z – Modern approaches to management – System approaches to management – Total quality management – Structural theories – Transnational media management theory – Organizational culture theory – Technology and innovation – Leadership theory.

UNIT III   HUMAN RESOURCE MANAGEMENT   9

Personnel management – Understanding the importance of human resources in media industry – Strategic human resources framework - Process and working of human resources team, Human resources research – Responsibilities of HR Team – Role of HR management in the development of media industry – Powers of HR in industry – Hiring process of the industry – Interviewing orientation – Performance reviews – Legal issues in personnel management – Power of communication in HR management – Employee welfare and grievances: Working with unions, Understanding labour laws in India, structure, communication strategies and personnel. HR planning, policies, development, evaluation and compensation.

UNIT IV   FINANCIAL MANAGEMENT   9
Accounting function, cost control, meeting financial goals, implementing financial management, budgeting monitoring financial performances – Financial analysis – Ratio analysis, Break-even analysis – Reporting financial performance – Monitoring financial progress.

UNIT V   PROGRAMMING: STRATEGY AND DISTRIBUTION   9
Broadcast programming, sales, promotion and marketing strategies: Its implication in media business – Print media programming, radio programming, television programming, digital media programming and its challenges – Management issues in programming – Audience research & its importance: Research and analysis, source of audience research data, using audience data, intense competition for audiences, uses of audience research in media management – Media business: regulatory bodies, guidelines, and media ownership in India.

TOTAL: 45 PERIODS

REFERENCES
1. Alan B. Albarran, Management of Electronic Media (6th ed.), Wadsworth, 2017
2. Peter K. Pringle, Michael F. Starr, Electronic Media Management Fifth Edition, Elsevier, 2006.
3. Philip Kotler et al., Marketing Management, Pearson Publications, 2016.
4. PravinDurai, Human Resources Management, Dorling Kindersley Publications, 2010.
5. Robert G. Picard, The Economics and Financing of Media Companies, Fordham University Press, 2002.
6. Benjamin M. Compaine et al., Who Owns the Media? 3rd ed., Knowledge Industry, 2001.
7. David Croteau and William Hoynes, The Business of Media, Pine Forge Press, 2001.
8. PG Aquinas, Human Resource Management: Principles and Practice, Vikas Publishing House, 2009.

MV5003	BIG DATA ANALYTICS	L T P C
		3 0 0 3

OBJECTIVES
- To handle and processing Big Data
- To know how and when data can be used to make key decisions
- To learn data processing and create Algorithms
- To introduce the data mining skills.
- To develop student skills on web mining.

UNIT I   FUNDAMENTALS OF BIG DATA ANALYSIS   9
Introduction to Big Data and Big Data Analysis, Handling and Processing Big Data, Methodological Challenges and Problems, Example Applications, Big Data Analysis in Practice, Introduction to different bog data analytical tools.

UNIT II   DATA SCIENCE   9
Introduction to Data Science, Relational Databases and SQL, Data Cleansing and Preparation, Building a Data Model, Data Summarization and Visualization, Association Analysis and Cluster Analysis.

UNIT III   DATA MINING   9
Pre- processing Data: Filters, Missing Value, Data Mining, Decision Trees, Classification / Regression Algorithms. Normalization, Distance, Correlations, Machine Learning, Compare Items, Predictive Revenue Model, Class Prediction Model

UNIT IV   LANGUAGE R   9
Introduction to R Language, Visualization, Data Procession, Time Series and Forecast, Indoor locationing, R Machine Learning.

UNIT V   WEB MINING   9
Case Study Session, Preparation of Case Study Report and Presentation and Case Study Presentation.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Apply the methods of data collection and data analytics to solve business and related problems in support of decision-making.
- Develop the skills necessary to use related software tools to perform data collection, cleansing, and analytics
- Have deep knowledge about data consumer, recognizing the good and the bad in terms of data collection and applications
- Understand how leading companies are using analytics
- Learn about relevant legal and ethical issues
- Explore the Machine Learning techniques.

REFERENCES
1. Ankam V. Big data analytics. Packt Publishing Ltd, 2016.
2. Dasgupta N. Practical Big Data Analytics: Hands-on techniques to implement enterprise analytics and machine learning using Hadoop, Spark, NoSQL and R. Packt Publishing Ltd, 2018
3. Patil MR, Thia F. Pentaho for big data analytics. Packt Publishing Ltd, 2013.
4. Sedkaoui S. Data analytics and big data. John Wiley & Sons, 2018.
5. Snodgrass RT. Developing time-oriented database applications in SQL. Morgan Kaufmann Publishers, 2000.
6. Somani AK, Deka GC, editors. Big Data Analytics: Tools and Technology for Effective Planning. CRC Press, 2017.

MV5004	EDITING TECHNIQUES	L T P C
		3 0 0 3

OBJECTIVES
- To appreciate editing as a creative element of storytelling.
- To understand procedures, techniques and standard practices involved in video editing.
- To understand the aesthetic principles and concepts of video editing.
- To understand the processes of mastering the AV for different platforms.
- To understand both aesthetic and technical aspects of post-production.

UNIT I   INTRODUCTION TO EDITING   9
History of editing – Analog or Linear editing techniques, editing workflow – Principles of editing – Roles and responsibilities of editing – Skills required for a successful editor – Elements of an edit – Format and codec, assessing the footage – Selecting the best shots.

UNIT II   VISUAL GRAMMAR   9
Definition of shot, scene, sequence – Five shot rule – Types of edit, transition, treatment of editing, time manipulation within shot & sequence – Cuts to display time – Walter Murch's criteria to cut, shot-reverse shot – Axial cut, B-roll, cutaway, Insert, Kuleshov effect – Parallel cutting, cross-cutting and dynamic cutting – Temporal editing, and associate editing.

UNIT III   EDITING TECHNIQUES   9
Order of shots – Duration of shots/ ASL, Dimensions of edit, Establishing continuity, Importance of tone, pace and rhythm – How to edit for different film genres – Montage, Colour and culture – 5 common film colour schemes, components in sound design – Stylistic uses of sound.

UNIT IV INTRODUCTION TO SOFTWARE AND BASIC EDITING 9

The user interface – Workspace management, clip ratings, importing – Transcoding media, insert edit, tools and its functions – Transitions and effects for video and audio – Keyframing, keying, and title.

UNIT V GRADING AND MASTERING 9

Colour correction – Effects: Pleasantville effect, censor effect, ken burns, draw mask, ramping – Export and sharing, finishing, mastering and delivery – Preparation for various medium distribution techniques behind it.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student will be able to:
- Know the workflow of the post-production process in various fields.
- Produce various projects using different editing styles and layouts.
- Produce professional-quality video projects for various platforms.
- Produce videos without any copyright issues.
- Inspire the audience with their skillful editing techniques.
- Work in various visual production industries.

REFERENCES

1. Alexis Van Hurkman, Colour Correction Look Book: Creative, 2013
2. Christoper J. Browen, Grammar of the Edit, 2018.
3. John Palmer, TheCensor, and the Theatres, December 2018.
4. Jon Gress, Visual Effects and Compositing, 2014.
5. Karel Reisz, Gavin Millar, The Technique of Film Editing, 2010.
6. Ken Dancyger, The Technique of Film and Video Editing: History, Theory and Practice, Nov 2018.

MV5005	ADVANCED ILLUSTRATION	L T P C
		3 0 0 3

OBJECTIVES

- To acquire knowledge on the fundamentals of illustration.
- To understand the principles of illustration.
- To understand the steps involved in creating an illustration.
- To acquire knowledge on various illustration styles.
- To express ideas in the form of illustrations.

UNIT I UNDERSTANDING ILLUSTRATION 9

Illustration – History, art and design for illustration – Elements of illustration – Line, shape, form, colour, value, texture and space – Introduction to illustration software – Workspace, working with documents – Drawing and transforming objects – Making and saving selections – Working with layers.

UNIT II PRINCIPLES OF ILLUSTRATION 9

Principles of illustration – Balance, contrast, emphasis, proportion, hierarchy, repetition, rhythm, pattern, white space, movement, variety and unity – Illustration composition principles – Design focus, leading lines, aligning, layout grids – Colour mode, colour theory, colour wheel, warm and cool colours, colour harmony, rule of the thirds, rule of odds – Working with shapes and objects – Working with colours, gradients, pattern fills, blends, points and paths.

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UNIT III   ILLUSTRATION PROCESS   9

Illustration process – Concept, inspiration, sketch – Colour scheme, building shapes, embrace feedback, finalize details – Tracing a hand-drawn sketch – Converting to illustration – Working with the type tool – Grouped vectors and compounding vector shapes.

UNIT IV   ILLUSTRATION STYLES   9

Illustration styles – Flat illustration, Granular gradients, shadowed surrealism, line and shadow realism, neon fluid, semi-flat–semi-realism, Palette knife, The Fleischer style, Mechanical realism, hyperrealism, application of illustration – Concept art – Children's book illustration – Graphic novel/comics, books, advertising, packaging, branding and logo.

UNIT V   CREATIVE ILLUSTRATIONS   9

Illustration types – Corporate illustrations, Advertising illustrations, Publication illustrations, Packaging illustrations – UI design, Environmental illustrations, Information illustrations – Professionalism in illustration and Perspectives for illustration.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the fundamentals of illustration.
- Learn the principles of illustration.
- Know the steps involved in creating an illustration.
- Gain knowledge of various illustration styles.
- Acquire the skills required to create illustrations.
- Express their ideas in the form of a creative illustration.

REFERENCES
1. Darrel Rees, How to be an illustrator?, Laurence King Publishing, 2014.
2. Derek Brazell, Becoming a Successful Illustrator, Bloomsbury Visual Arts, 2017.
3. Wallace Jackson, Digital Illustration Fundamentals, Apress, 2016.
4. Brian Wood, Adobe Illustrator CC Classroom in a Book, Pearson Education, 2018.
5. DT Editorial Services, Illustrator CC in Simple Steps, Dreamtech Press, 2019.

MV5006	**LIGHTING AND RENDERING**	**L T P C**
		2 0 2 3

OBJECTIVES
- To introduce the basics of lighting in 3D.
- To create photorealistic still imagery.
- To impart knowledge on lighting and rendering techniques.
- To introduce virtual lighting technologies and tools necessary to create photorealistic imagery.
- To inculcate enhanced techniques for lighting the scene.

UNIT I   LIGHTING THE 3D MODEL USING BASIC LIGHTING   12

Preview lights and to choose its colours– Point light and its properties – Direction light and its properties – Spotlight, penumbra angle, Barn doors and its settings – Area light and its implementation in a real-time environment.

UNIT II   LIGHTING TECHNIQUES AND MENTAL RAY RENDERING   12

Software lighting techniques – Light intensity and digital colours– Light linking & object linking – Introduction about mental ray nodes – Interior scene lighting using mental ray-1 – Interior scene lighting using mental ray-2

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UNIT III   PRODUCT LIGHTING & ENVIRONMENT LIGHTING   12
Three-point lighting technique – Lighting a product using three-point lighting techniques – Photons and caustics lighting methods – global illumination and final gathering.

UNIT IV   ADVANCED RENDERING MATERIALS   12
Advanced Materials for Mental Ray rendering – Light Baking for Games – Exploring Paint Effects features – Layer Based Rendering and its Memberships.

UNIT V   EXTERIOR AND IBL RENDERING   12
Image-based Lighting for a 3D Object – Rendering an Exterior using Image-based Lighting – Optimization techniques for lighting the scene – Lighting a Photorealistic scene based on a live reference – Portfolio creation.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Learn the basic concepts of lighting in 3D.
- Gain awareness of the physical and virtual technology of lighting.
- Understand the interaction of lights with a 3D surface.
- Use advanced rendering materials.
- Incorporate lighting on a live reference.

REFERENCES
1. Lee Lanier, Maya Studio Projects Texturing and Lighting, 1st Edition, Sybex, 2011.
2. Jason Gregory, Game Engine Architecture, Third Edition, 2019.
3. Henry Plummer, The Architecture of Natural Light, 2009.
4. Jeremy Birn, Digital Lighting and Rendering, 3rd Edition, New Riders, 2013.
5. Christopher Meek, Kevin van den Wymelenberg, Day-lighting and Integrated Lighting Design, 2014.

MV5007	HUMAN-CENTRED INTERACTION DESIGN	L	T	P	C
		2	0	2	3

OBJECTIVES
- To acquire knowledge on the fundamentals of Human-Centred Interaction Design.
- To understand the step-by-step process involved in the development of Human-Centred Design.
- To impart knowledge on the field of Interactive Experience Designing in media, products and computer application designs.
- To help students develop good analytical abilities to gain knowledge of specific techniques and to develop creative solutions.
- To sensitize students about the needs of Indian users and the Indian industry.

UNIT I   INTRODUCTION TO DESIGN   12
Historical evolution of the field – Interactive system design (theory and practice) – Concept of usability – definition and elaboration – HCI and software engineering – GUI design and aesthetics – Prototyping techniques.

UNIT II   MODEL-BASED DESIGN AND EVALUATION   12
The basic idea – introduction to different types of models – GOMS family of models (KLM and CMN – GOMS) – Fitts' law and Hick Hyman's law – Model-based design case studies – Guidelines in HCI – Shneiderman's eight golden rules – Norman's seven principles – Norman's model of interaction – Nielsen's ten heuristics with examples of its use – Heuristic evaluation – Contextual inquiry – Cognitive walkthrough.

UNIT III   EMPIRICAL RESEARCH METHODS   12

Motivation – issues – research question formulation techniques – Experiment design and data analysis – Task modeling and analysis – Hierarchical task analysis (HTA) – Engineering task models and Concur Task Tree (CTT).

UNIT IV   DIALOG DESIGN   12

Introduction to formalism in dialog design – design using Finite State Machines – State charts and Petri Nets in dialog design – Cognitive architecture – Introduction to CA, CA types, the relevance of CA in IS design – Model Human Processor (MHP) – Object-Oriented Programming.

UNIT V   IMPLEMENTATION AND EVALUATION   12

Introduction to Implementation support – screen and resource management – Management and Architecture – Toolkits – Paint and Event Models. Types of Evaluation –Studies and Experiments – Mobile App Evaluation – From Data to Knowledge – Analysing and Interpreting Wason Card Test Data – From Evaluation to Validation.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the basic concepts in human-computer interaction.
- Understand the process involved in the development of a human-centred design.
- Comprehend the importance of design principles and the evaluation methods for user interfaces.
- Develop creative solutions through good analytical abilities.
- Devise creative solutions for issues and needs of Indian users and the Indian industry.

REFERENCES
1. Ghaoui, C. (Ed.), Encyclopedia of Human-Computer Interaction, IGI Global, 2005.
2. Sears, A., and Jacko, J. A. (Eds.), Human-Computer Interaction: Design Issues, Solutions, and Applications, CRC Press, 2009.
3. Yvonne Rogers, Helen Sharp, and Jennifer Preece, Interaction Design 3rd Edition, Wiley, 2011.
4. Frank Bentley and Edward Barrett, Building Mobile Experiences, MIP Press Cambridge, 2012.
5. Jacob Nieilsen, Usability Engineering, Morgan Kaufmann, Academic Press, London, 1993.

PROGRESS THROUGH KNOWLEDGE
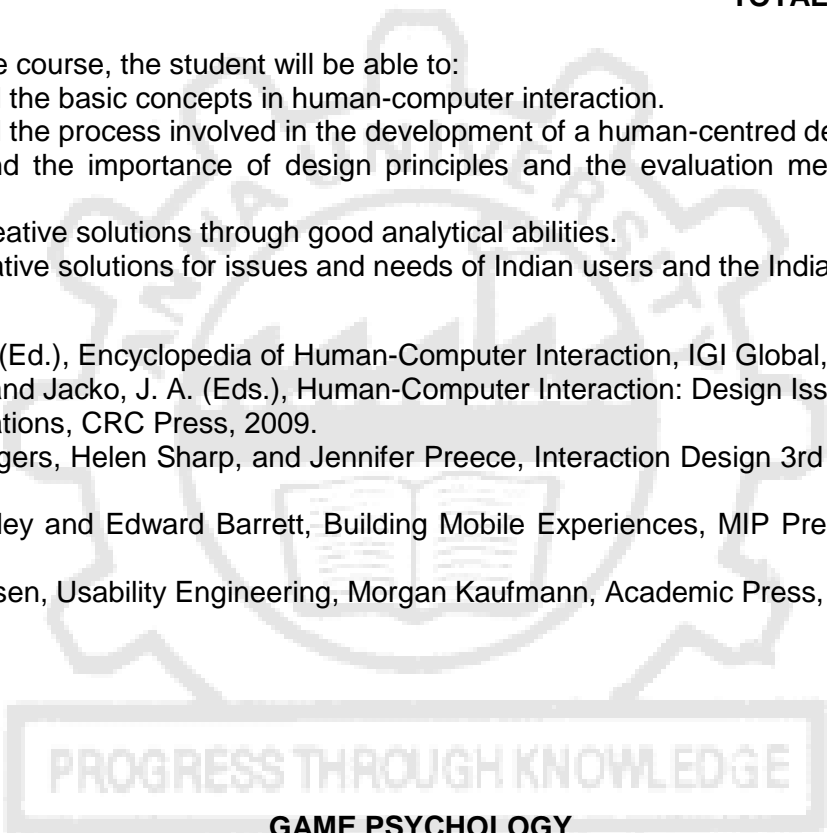
MV5008	GAME PSYCHOLOGY	L	T	P	C
		2	0	2	3

OBJECTIVES
- To understand the fundamentals of game psychology.
- To introduce social psychology theories and concepts for a better understanding of how people perceive, think and feel about the social world through the game.
- To understand the influence of gaming technologies on human behaviour, culture and society.
- To understand the mind of the gamer.
- To understand the psychology of the gaming world.

UNIT I   INTRODUCTION TO GAME PSYCHOLOGY   12

Definitions – Foundations of game psychology – Positive psychology approach, pro-social & antisocial behavior learning through the game – Stereotyping, prejudice, and discrimination: causes, effects, and cures – Global gaming industry: game effects on society, individuals and cultures.

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UNIT II GAME AND GAMER PERCEPTION 12

Learning social life lessons through the game – Understanding human values, Social representations, social norms, social cognition – Gamer attitude among people – Game psychology – History and development of the game and its engine – Game as an industry for earning.

UNIT III GAME INFLUENCE ON BEHAVIOUR & RELATIONSHIPS 12

Value of game and relationship – Earning through game, emotions – Explaining Behaviour – Social beliefs, social influence, perception – Cultural influences – Friendship and love – Interpersonal attraction and close relationships – Para-social interaction, celebrity & fandom – Relaxing and addition through the game.

UNIT IV SOCIAL INFLUENCE 12

Approaches – Prejudice, stigma, reducing intergroup conflict, aggression, attraction, altruism, application, propaganda and persuasion – The fine art of persuasion – Social Influence – Conformity – Bystander intervention through the game, learning of obedience to authority – Social facilitation – Social Status – Social roles – Social conformity, Interpersonal attraction, Behavioural influences on attitudes – Attitude formation – Cognitive dissonance.

UNIT V GAME WORLD 12

Understanding psychology & internet – Psychological issues in addressing through playing online games – Interactive & emerging technologies, social influence in the virtual world – Social connection & social capital, personal media – Mobile, progress and future scope.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Apply the appropriate psychological theory.
- Analyze the complex gaming environment.
- Develop skills towards all generalizations about game psychology.
- Develop critical thinking attitude.
- Evaluate game messages based on evidence.

REFERENCES
1. Berne, E. Games People Play: The Basic Handbook of Transactional Analysis. Tantor eBooks, 2016.
2. Bostan, B., & Tingoy, O. Game Design and Gamer Psychology. Gamer Psychology and Behavior (pp. 105 – 121). Springer, Cham., 2016.
3. Dixon, J., Barker, J. B., Thelwell, R. C., & Mitchell, I. (Eds.). The Psychology of Soccer: More Than Just a Game. Routledge, 2020.
4. Ferguson, C. J. (Ed.). Video Game Influences on Aggression, Cognition, and Attention. Springer, 2018.
5. Hodent, C. The Psychology of Video Games. Routledge, 2020.
6. Madigan, J. Getting Gamers: The Psychology of Video Games and their Impact on the People Who Play Them. Rowman & Littlefield, 2019.

MV5009	CHARACTER DESIGNING	L T P C
		2 0 2 3

OBJECTIVES
- To learn basic anatomy of a character.
- To apply basic properties of physics to the scene.
- To create a character walk cycle.
- To work with poly to develop the characters.
- To create motion for a character.

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UNIT I   3D SURROUNDINGS   12
Weight – Environment – Solidity – Force – Construction, Bowling ball – Soccer ball, Balloon, animating 2D bowling ball – Creating a simple object.

UNIT II   CHARACTERS   12
Construction of animal character – Pantomime horse construction, Cartoon four-legged construction, four types of animal locomotion – walking, trotting, cantering and galloping, walk cycle or run cycle.

UNIT III   HUMAN ANATOMY   12
Basic human anatomy – spine, ribcage, pelvic girdle, skull, shoulders – Joints: Plane joints, Pivot joints, Hinge joints, Ball and socket joints, saddle joints – Constructing the basic character – Skin, Bones – Parent and child relation in bones – Child of joint – Naming conveniences of bones.

UNIT IV   PHYSICS IN 3D   12
Emotions – Eight basic efforts: pressing, flicking, wringing, dabbing, slashing, gilding, thrusting, floating – Body language – body postures, basic modes, palm, hand-arm and leg gestures.

UNIT V   EMOTION FOR THE CHARACTER   12
Emotions – happy, sad, smile anger, fear, disgust, pain – Eye movements, eyebrows, head angle, mouth and lip movement – M, B, P, F, V – Vowels – O, AR, A, E – Teeth and tongue movement – Basic rigging concept IK and FK concept.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand different principles involved in character animation.
- Understand human anatomy in character animation.
- Design the characters sketched by them.
- Animate their characters.
- Create animatics.
- Independently create characters for the animation movie.

REFERENCES
1. Andy Beane, 3D Animation Essentials, John Wiley & Sons, Inc. 2012.
2. Bancroft T. Creating Characters with Personality. Watson-Guptill, 2016.
3. Giesen R, Khan A. Acting and Character Animation: The Art of Animated Films, Acting, and Visualizing. CRC Press, 2017.
4. Horn EV. 3D character development workshop: rigging fundamentals for artists and animators. Dulles, VA: Mercury Learning and Information, 2018.
5. ONeill R. Digital character development: theory and practice. Boca Raton: CRC Press, 2015.
6. Roberts Steve. Character Animation Fundamentals: developing skills for 2d and 3d character animation. Place of publication not identified: CRC Press, 2017.
7. Tinwell A. The Uncanny Valley in Games and Animation. AK Peters/CRC Press, 2014.

MV5010	PROGRAMMING FOR GAMING	L T P C
		2 0 2 3

OBJECTIVES
- To understand the concepts of Game design and development.
- To learn the processes, mechanics and issues in Game Design.
- To understand the concepts of Game programming.
- To know about Game programming platforms, frameworks and engines.
- To enable students develop games.

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UNIT I   3D GRAPHICS FOR GAME PROGRAMMING   12

3D Transformations – Quaternions – 3D Modelling and rendering – Ray tracing, shader models, lighting, colour, texturing – Camera and projections – Culling and clipping – Character animation, Physics-based simulation, Scene graphs.

UNIT II   GAME ENGINE DESIGN   12

Game engine architecture – Engine support systems – Resources, file systems, game loop, real-time simulation – Human interface devices – Collision and rigid body dynamics – Game profiling.

UNIT III   GAME PROGRAMMING   12

Application layer – Game logic, Game views – Managing memory – Controlling the main loop, loading and caching game data – User Interface management– Game event management.

UNIT IV   GAMING PLATFORMS AND FRAMEWORKS   12

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines – Unity – DX Studio.

UNIT V   GAME DEVELOPMENT   12

Developing 2D and 3D interactive games using DirectX or Python – Isometric and tile-based games – Puzzle games, Single player games, Multi-player games.

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student will be able to:
- Understand the concepts of game design and development.
- Design the game and use mechanics for game development.
- Explain the core architecture of the game's programming.
- Use game programming platforms, frameworks and engines.
- Create interactive games.

REFERENCES

1. Ernest Adams and Andrew Rollings, Fundamentals of Game Design, 2nd Edition Prentice Hall / New Riders, 2009.
2. Eric Lengyel, Mathematics for 3D Game Programming and Computer Graphics, 3rd Edition, Course Technology PTR, 2011.
3. Jesse Schell, The Art of Game Design: A Book of Lenses, 1st Edition, CRC Press, 2008.
4. Mike McShaffrfy and David Graham, Game Coding Complete, Fourth Edition, Cengage Learning, PTR, 2012.
5. Jason Gregory, Game Engine Architecture, CRC Press / A K Peters, 2009.

MV5011   **IMAGE PROCESSING**   **L T P C**
                                                              2 0 2 3

OBJECTIVES

- To identify the users and learn various methods to collect user behavior data.
- To develop a deep understanding of business-centred design.
- To create efficient prototype to communicate and validate the design definition.
- To apply UX process to web, mobile & small screen device.

UNIT I   INTRODUCTION TO IMAGE PROCESSING   12

Image Representation and Image Processing Paradigm - Elements of digital image processing –Image model – Sampling and quantization – Relationships between pixels – Connectivity, Distance Measures between pixels – Colour image (overview, various colour models) – Various image formats bmp, jpeg, tiff, png, gif, etc.

UNIT II DIGITAL IMAGE – OPERATIONS & IMAGE ENHANCEMENT 12

Topological properties of digital images – Histograms, Entropy, Eigen Values - Image Quality Metrics-Noise in images sources, types – Arithmetic operations – Addition, subtraction, multiplication, division-logical operations NOT, OR, AND, XOR-Set operators – Spatial operations Single pixel, neighbourhood, geometric – Contrast Stretching – Intensity slicing – Bit plane slicing Power Law transforms –Spatial and frequency domain – Histogram processing – Spatial filtering –Smoothening spatial filters – Sharpening spatial filters – Discrete Fourier Transform – Discrete Cosine Transform – Haar Transform – Hough Transform – Frequency filtering – Smoothening frequency filters – Sharpening frequency filters – Selective filtering.

UNIT III DIGITAL IMAGE RESTORATION & FEATURE EXTRACTION 12

Noise models – Degradation models – Methods to estimate the degradation – Image de-blurring –Restoration in the presence of noise only spatial filtering -- Periodic noise reduction by frequency domain filtering-Inverse filtering – Wiener Filtering – Geometrical transformation – Point based methods- Surface based methods – Intensity based methods –Region of interest (ROI) selection - Feature extraction: Histogram based features – Intensity features – Colour, shape features – Contour extraction and representation – Homogenous region extraction and representation – Texture descriptors – Feature selection: Principal Component Analysis (PCA).

UNIT IV IMAGE SEGMENTATION 12

Discontinuity detection – Edge linking and boundary detection. Thresholding – Region oriented segmentation – Histogram based segmentation – Object recognition based on shape descriptors. Dilation and Erosion – Opening and closing – Medial axis transforms – Objects skeletons –Thinning boundaries.

UNIT V IMAGE CODING & COMPRESSION 12

Lossless compression versus lossy compression – Measures of the compression efficiency – Hufmann coding – Bitplane coding – Shift codes – Block Truncation coding – Arithmetic coding –Predictive coding techniques – Lossy compression algorithm using the 2-D – DCT transform – The JPEG 2000mstandard Baseline lossy JPEG, based on DWT.

TOTAL: 60 PERIODS

OUTCOMES

At the end of this course, students will understand/learn/develop:
- The basics of image processing concepts, image transforms and image enhancement techniques involved
- Demonstrate image restoration process and experiment the various image segmentation and morphological operations for a meaningful partition of objects
- Design the various basic feature extraction and selection procedures
- the various image compression techniques and their applications and analyze and implement image processing algorithms for various real-time applications

REFERENCES

1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, Third Ed., PrenticeHall, 2008.
2. William K. Pratt, Digital Image Processing, John Wiley, 4th Edition, 2007.
3. Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 1997.
4. Sonka, Fitzpatrick, Medical Image Processing and Analysis, 1st Edition, SPIE, 2000.

MV5012	**INSTRUCTIONAL DESIGN FOR DIGITAL MEDIA**	L T P C
		2 0 2 3

OBJECTIVES
- To understand instructional systems design and processes for effective instruction.
- To establish a learning environment that fosters positive learning experiences.
- To apply the communication techniques and instructional strategies for varied teaching and learning contexts.
- To promote technology-enabled teaching learning experiences.

UNIT I   INSTRUCTIONAL SYSTEMS DESIGN   12

Introduction to Instructional Systems Design — Learning theories and how they inform instructional systems design — Basic processes of instructional design — Need assessment and instructional goals — Learning objectives — Taxonomies of cognitive levels — Assessment: diagnostic, formative, summative — Effective instructional strategies — Engaging and inspiring acquisition of knowledge — Learning theories: Behaviorism, Cognitivism, Constructivism, and Connectivism.

UNIT II   MODELS OF INSTRUCTIONAL DESIGN   12

Models of teaching — Concept, features, and implications in the classroom — Bloom's Taxonomy — Dale's Cone of Learning — Vygotsky's theory of social development — Kirkpatrick's Model — ADDIE Model — Rapid prototyping — Dick and Carey Model — Component Display Theory (David Merrill) — Motivational Design — ARCS Model — Motivational Design Process — Robert Gagne's nine events of instruction.

UNIT III   TEACHING-LEARNING STRATEGIES   12

Learning as a science – Scaffolding and meta-cognition — Goal-centred criteria — Learner-centred criteria — Context-centred criteria — Assessment-centred criteria — Learning components of instructional strategies — Pre-instructional activities — Content presentation and examples — Learner participation — Assessment follow-through activities — Teaching strategies: summarizing, note taking, homework, and practice — Reinforcing effort and providing recognition — Cooperative learning — Differentiated learning — Designing and implementing inclusive classrooms — Four-quadrant approach to e-learning (video lecture, downloadable reading material, assessment and quizzes, and online discussion forum).

UNIT IV   EVALUATION OF INSTRUCTIONAL SYSTEMS   12

Components of the instructional package — Selecting existing instructional materials — The designer's role in material development and instructional delivery — Developing instructional materials — Formative evaluation — Rough draft materials — Human-computer interaction — Validation of instructional material — Outcome-based education (OBE) assessment — Printed materials, still pictures, and graphics — One-to-one evaluation with learners — Small-group evaluation — Field trials — Educational Decisions Model (CIPP Model).

UNIT V   DIGITAL TECHNOLOGIES FOR CONTENT DELIVERY   12

Introduction to Learning Management Systems — Web technologies for content delivery — Open educational resources — The learner and the intelligent tutoring systems — Research methods in instructional technology — Educational game design — Learning analytics — Educational data mining Strategies — Delivery and management — Production — The future of ISD — Instructional design and technology — Metacognition in instructional design.

TOTAL: 60 PERIODS

OUTCOMES
- To provide rationales for using a systematic approach to instructional design.
- To identify and summarize the steps and methods of the instructional design process.
- To function independently and cooperatively in teamwork.
- To compare and contrast various instructional design perspectives.
- To apply LMS and web technologies for online learning.

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REFERENCES

1. Dick, W., Carry, L. & Carey, J. O. The Systematic Design of Instruction, 6th Edition, MA, Boston: Allyn and Bacon, 2005.
2. Smith P.L. & Ragan T.J. Instructional Design. New York: Wiley, 1999.
3. Rothwell, W.J. & Kazanas, H. C. Mastering the Instructional Design Process: A Systematic Approach, 2nd Ed., 2008.
4. Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. Instructional Media and Technologies for Learning. Upper Saddle River, NJ: Prentice-Hall, 1999.
5. Luca Botturi, Todd Stubbs, Handbook of Visual Languages for Instructional Design: Theories and Practices, Idea Group, 2008.
6. Clark, R. C. & Mayer, R. E. e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning. Hoboken, NJ, 2002.
7. Gagné, R. M. Principles of Instructional Design. Belmont, CA: Thomson/Wadsworth, 2005.

MV5013   **DEEP LEARNING**   **L T P C**
                                                                                  2 0 2 3

OBJECTIVES

- To present theoretical foundations, algorithms, methodologies, and applications of neural networks and deep Learning.
- To train and test application-specific deep learning models and to provide the practical knowledge
- To apply the deep learning models in various real-world applications

UNIT I   BASIC CONCEPTS OF DEEP LEARNING   12

Introduction to deep learning --– Neural networks – Back propagation – Stochastic Gradient Descent -- Introduction to recurrent neural networks -- Introduction to convolutional neural networks.

UNIT II   DEEP LEARNING IN IMAGE PROCESSING
**   AND COMPUTER VISION   12**

How deep learning can be applied in media and technology? -- Introduction to computer vision -- Introduction to Tensorflow and keras -- Computer vision and their real-life applications -- Scope of computer vision -- Generating alternative texts using computer vision [applied examples with Facebook & Instagram.

UNIT III   DEEP LEARNING IN TEXT & SPEECH ANALYSIS   12

Basic linguistics and terms – Language analysis – Natural Language Processing (NLP) projects: characteristics, planning, and other factors -- Sentiment Analysis -- Topic Modelling -- Visualization of speech data -- Transformations in speech data -- Applications based on speech data.

UNIT IV   APPLICATION OF DEEP LEARNING IN MASS MEDIA ENVIRONMENT   12

Deep learning and their applications in digital marketing -- Processing and manipulating structured and unstructured data -- Working with social media data -- Caches and cookies -- Introduction to AI-based recommendation systems -- Implementation of AI-based recommendation systems -- Working with Netflix metrics.

UNIT V   DEEP LEARNING FOR BUSINESS ANALYTICS   12

Deep learning to evaluate TRP metrics and content performance -- Predicting content scope with regression models -- Analyzing product performance by processing user reviews -- Building predictive models with text data as an input.

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student will be able to:
- Understand different methodologies to create application
- Recognize the characteristics of deep learning models that are useful to solve real-world problems
- Identify and apply appropriate algorithms
- Design and Implement different deep learning algorithms
- Develop various models for real world problems solving and encoding the original data and reconstruct data.

REFERENCES

1. Giancarlo Zaccone, Md. Rezaul Karim, Ahmed Menshawy, Deep Learning with TensorFlow: Explore Neural Networks with Python, Packt Publisher, 2017.
2. Deng & Yu, Deep Learning: Methods and Applications, Now Publishers, 2013.
3. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016.
4. Michael Nielsen, Neural Networks and Deep Learning, Determination Press, 2015.

MV5014	ADVANCED COMPOSITING TECHNIQUES	L T P C
		2 0 2 3

OBJECTIVES
- To understand the pipeline of visual effects.
- To study the new techniques involved in Compositing.
- To understand the working of visual effect shots.
- To instill knowledge about colour correction.
- To make students work with particles.

UNIT I   BASIC VISUAL ELEMENTS   12
To understand the UI of software, viewer, metadata, creating stick nodes, postage stamps, working with tracking – single, double, four-point tracking – rotation and scaling. To understand the x and y-axis of footage and to stabilize running footage. Match move an object to the footage and rendering.

UNIT II   INTRODUCTION TO ROTOSCOPING   12
To understand and work with rotoscoping, Bezier, B – Splines, shapes, feather – Compositing with different footage using roto – Exporting and importing the alpha channel – Retouching with the Rotopaint – Working with wire removal shots – Creating and working with a clean plate, Working with Graph editors – Understanding and working with the match move process.

UNIT III   MATTE AND COLOUR CORRECTION   12
Working with blue/green matte footage, Using different keyers, IBK colour, Key light, Chroma key, Alpha key – Creating a garbage mask – Matching light space and adjusting for brightness and colour, Copying channel and working with shuffle channel options – Adding noise in the live-action videos, Removing grain and dust – Creating and working with titles, Particles in compositing, Creating the digital crowd, Colour correction and Grading the footage – Time warping, Understanding and working with distorted images and videos.

UNIT IV   WORKING WITH 3D   12
Working with 3D space in compositing – Creating the multiple pass render – Working with camera tracking – Applying the camera movement to footage –Creating an external geometry – Importing camera data and normalize it – Using HDRI images to light the source – Working with keyframe – Creating a Matte paint – Creating and merging the set extensions object to live-action – Obtaining the clean plate from the footage – Merging the multi-pass render to a single output – Matching the Lights and shadows.

UNIT V   ADDING ELEMENTS   12

Creating the depth map – Understanding the Z-Depth – Composite stereoscopic 3D – Working with particles, creating particle simulation – Working with Smart vectors – Understanding and working with deep compositing – Animating using python script.

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student will be able to:

- Understand the visual treat in the films.
- Create new visual effects for their production.
- Develop the 3D Environment.
- Merge the live-action footage with visual effects.
- Simulate particle items.
- Code Python scripts for Visual Effects.

REFERENCES

1. Dinur E, The Filmmaker's Guide to Visual Effects: The Art and Techniques of VFX for Directors, Producers, Editors and Cinematographers, Focal Press, 2017.
2. Ganbar R. Nuke 101: Professional Compositing and Visual Effects, Peachpit Press, 2014.
3. Higgins S, North D, Monticone P, Rogers A, Polan D, Turnock J, Wright B, Overpeck D, Purse L, Dhir M, Allison T, Editing and Special/Visual Effects, Rutgers University Press, 2016.
4. Hornung E, The Art and Technique of Matchmoving: Solutions for the VFX Artist, Focal Press, 2013.
5. Lanier L, Advanced Visual Effects Compositing: Techniques for Working with Problematic Footage, Focal Press, 2017.
6. Lanier L, Aesthetic 3D Lighting: History, Theory, and Application, Focal Press; 2018.

MV5015	MOTION GRAPHICS	L T P C
		2 0 2 3

OBJECTIVES

- To become visually literate and competent with the non-verbal languages of art and design.
- To develop visual, verbal and written responses to visual phenomena. To develop perception and create conceptualizations both rationally and intuitively.
- To learn the basic principles of storyboarding and project mapping.
- To learn the concept of tracking.
- To understand the usage of 3D in live-action.

UNIT I   INTRODUCTION TO GRAPHICS   12

General principles of Motion Graphics – Different software used for motion graphics, Photoshop, Final cut pro, Premier Pro, After Effects, Combustion, Nuke – Creating a Pipeline for production – Exercises for different software – Creating a storyboard.

UNIT II   KEYING, ROTO AND TRACKING   12

Understanding and working with keying concepts – Working with different types of keyers – Working with Roto shots – Removing the blue/green screen using different keyers – Working with 2D tracking – Working with planar tracking.

UNIT III   GRADING   12

Working with RGB – Colour waveform, colour histogram, Curves – Understanding the alpha value, Colour grading of Computer-generated objects – Adding lights and shadow – Matching light space and adjusting for brightness and colour – Masking the region – Working with layer and Node-based software.

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UNIT IV   3D GRAPHICS   12

Camera tracking in different software – Combining of graphics elements into live-action – Creating and modifying 3D objects, importing 3D materials to various software – Creating a 3D title.

UNIT V   AUDIO   12

Understanding audio properties – Working with different levels of audio – Different types of audio formats – Working with multi-track audio – Rendering the final mix-down audio – Lip syncing with the visual – Exporting the final output.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Shoot graphic videos on their own.
- Understand the concept of grading.
- Assemble the green /blue screen footage.
- Work with 3D environment digitally.
- Work with audio.
- Understand the concept of rendering.

REFERENCES
1. Blazer L, Animated storytelling: Simple Steps for Creating Animation and Motion Graphics, Peachpit Press, 2015.
2. Ian Crook, Peter Beare, Motion Graphics: Principles and Practices from the Ground Up, Bloomsbury Publishing, 2017.
3. Jackson C, After Effects for Designers: Graphic and Interactive Design in Motion, Focal Press, 2018.
4. Jon Krasner, Motion Graphic Design: Applied History and Aesthetics, Focal Press, 2013.
5. Shaw A, Design for Motion: Fundamentals and Techniques of Motion Design, Focal Press, 2015
6. Stone RB, Wahlin L. The Theory and Practice of Motion Design: Critical Perspectives and Professional Practice, Routledge, 2018.

MV5016	3D GAME DEVELOPMENT	L T P C
		2 0 2 3

OBJECTIVES
- To understand the 3D game design process.
- To understand the 3D game development process.
- To understand the physics and mechanisms involved in the 3D game development process.
- To inculcate the knowledge of effective programming in gaming.
- To understand the various concepts of Game Engineering.

UNIT I   INTRODUCTION TO GAME ENGINEERING   12

History of Games – History of 3D Games – 3D Games Taxonomy – Gameplay – Gamification – Game Development – Game Developers – Game Development Tool – Game Development Lifecycle Models – Project Management Triangle – UML Diagrams for Game Development – Game Design Document (GDD) - Introduction to the 3D user interface of game engine - Create player characters – Create Interactions with objects in the game.

UNIT II   UNDERSTANDING 3D GAME ENGINE   12

Creating and destroying game objects – Access the components – Events for game objects – Dealing with vector variables and timing variables – Physics oriented events – Coroutine and return types – Physics components: coordinates, vectors, rigid bodies and forces – Colliders and collisions. Creating ticker-taker game - Understand and implement the law of physics. Create ball and hitter - Add light - Add physics to the game - Create a MouseFollow script.

UNIT III   INTRODUCTION TO C# SCRIPT   12

Introduction to C# – Scripts as behaviour components – Data types – Variable and functions – Conditional statements – Loops, classes, instantiate, scope and access modifiers – Arrays – Invoke and enumerations – Awake and start – Update and fixed update – Vector math – Activating game objects – Linear interpolation – Events – Event handlers – Delta time – Creating scenes-based games -- Create a Robot Repair game -- Set up two scenes -- Create GUI =- Create button UI control -- Build the card flipping function -- Prepare the clock script.

UNIT IV   GAME BEHAVIOUR   12

Behavior – Rigid body 2D – Gravity – Making the game object move using C# Script – Handling collisions of game object using Collider 2D – Creating game objects at runtime using Prefabs – Prefab instantiation – Making it move and setting speed – Parent and Child Game Objects – Detecting collisions with on collision enter – Destroying game objects – Controlling game objects using Components: Mode, Add Velocity, force -- Create the break-up game -- Create spark material, light, camera and apartment -- Add and script the character – Create particle system -- Add sounds.

UNIT V   BUILDING AND SHARING 3D GAME   12

Introduction to 3D Canvas – Adding and Updating UI Elements to Game Canvas – Adding Sound Effects to Game – Building settings – Adapting for Web build – Texture compression and debug stripping – Quality settings – Player input settings – Sharing the game – Testing and finalizing -- Create a shoot the moon game -- Duplicate the game project -- Add and tweak the character. Add two cameras and lights-- Setup camera rig -- Animate the bouncer-- Animate the runner -- Deploy the game.

                                                                      TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Understand the concept of game development.
- Implement the concept of programming in Gaming.
- Demonstrate using a game engine to create 3D games.
- Use the skills to write C# scripting language to give actions to game objects.
- Implement different gameplay elements.

REFERENCES
1. Alan Thorn, Practical Game Development with Unity and Blender, CENGAGE Learning Custom Publishing, 2014.
2. Alex Okita, Learning C# Programming with Unity 3D, CRC Press, 2014.
3. Daniel Schuller, C# Game Programming: For Serious Game Creation, CENGAGE Learning Custom Publishing, 2011
4. Jeff W Murray, C# Game Programming Cookbook for Unity 3D, CRC Press, 2014.
5. Jeremy Gibson Bond, Introduction to Game Design, Prototyping, and Development, Addison-Wesley Professional, 2014.
6. Stefan Zerbst and Oliver Duvel, 3D Game Engine Programming, Premier Press, 2004.

MV5017   VIRTUAL AND AUGMENTED REALITY DEVELOPMENT   L T P C
                                                                      2 0 2 3

OBJECTIVES
- To explore both history of virtual reality (VR).
- To explore the physiology and perception involved in VR.
- To impart the practical and conceptual knowledge on VR development as well as to divulge relevant theory behind VR technologies.
- To familiarize students with tracking and simulation processes involved in VR. Attested
- To get familiarize with modeling objects and rendering them to make VR

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UNIT I INTRODUCTION TO VR AND AR 12
Introduction to VR – Historical perspective – Birds-eye view: general – Hardware, software – Sensation and perception – Geometry of Virtual Worlds: Geometric modeling, Transforming models, Matrix algebra, 2D and 3D rotations, Homogeneous transforms, chain of viewing transforms, Eye transforms, Canonical view transform, Viewport transform – Light and Optics, Visual physiology, Visual perception, Tracking systems, Visual rendering.

UNIT II VISUAL PHYSIOLOGY AND PERCEPTION 12
Parts of the human eye, photoreceptors and densities, scotopic and photopic vision, display resolution requirements, eye movements, neural vision structures, sufficient display resolution, other implications of physiology on VR – Photoreceptors – Sufficient resolution for VR, Light intensity, Eye movements, Neuroscience of vision – Depth perception, Motion perception, Frame rates and displays.

UNIT III TRACKING 12
Overview, Orientation tracking, Tilt drift correction, Yaw drift correction – Tracking with a camera, Perspective n-point problem, Filtering, Lighthouse approach – Velocities, acceleration, vestibular system, virtual world physics, simulation, collision detection, Avatar motion.

UNIT IV RENDERING 12
Visual Rendering: Visual Rendering – Overview, Shading models Rasterization, Pixel shading, VR specific problems, Distortion shading – Post-rendering image warp.

UNIT V AUDIO AND INTERFACES 12
Audio: Physics and physiology, Auditory perception, Auditory localization, Rendering, Spatialization and display, Combining other senses – Interfaces: Locomotion, Manipulation, System control, Social interaction – Evaluation of VR systems/

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to
- Describe the history of VR.
- Describe the physiology and perception involved in VR.
- Demonstrate an understanding of the theory behind VR technologies
- Demonstrate an understanding of tracking and simulation processes involved in VR.
- Design models and render them to make VR
- Develop interface and sounds to create VR environment.

REFERENCES
1. Robert R Powell, Future Cyborgs: Human-Machine Interface for Virtual Reality Applications, 2012.
2. George Mather, Foundations of Sensation and Perception: Psychology Press; 2 edition, 2009.
3. Peter Shirley, Michael Ashikhmin, and Steve Marschner, Fundamentals of Computer Graphics, A K Peters/CRC Press; 3 edition, 2009.
4. The history of the future: Oculus, Facebook and the Revolution that swept Virtual Reality, by Blake J. Harris, 2019.
5. Virtual Reality by Steven M. LaValle. Cambridge University Press. 2019.

MV5018	MOBILE GAMING	L	T	P	C
		2	0	2	3

OBJECTIVES
- To understand the history and development of mobile games.
- To introduce the android mobile interface.
- To test several games in a mobile environment.
- To develop a user-friendly game in a mobile environment.
- To understand the best practices in mobile game development.

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UNIT I INTRODUCTION TO MOBILE GAMING 12
Introduction to Unity and C# –Prototyping using C# – Unity editor – Game from the 8- bit era – Super Mario Bros. – Factors in developing mobile applications – Mobile Software Engineering – Frameworks and Tools.

UNIT II DESIGNING GAME 12
Generic UI Development – Android interface working – Intents on UIs, VUIs and mobile apps – Characteristics of mobile applications – Storing and retrieving data – Getting the model right – Working with a content provider.

UNIT III DEVELOPING GAME 12
Android networking and web – Deciding scope of an app – Wireless connectivity and mobile apps – Notifications and alarms – Performance and multithreading – Android graphics and multimedia – Mobility and location-based services.

UNIT IV TESTING GAME 12
Logic Introduction to logic-based problem solving – First-time User Experience – Continued User Experience – Final Game Evaluation – Bug Fixes – Multi-view Geometry – Bayesian Vision – Statistical classifiers – Clustering &segmentation – Voting methods – Generate & test.

UNIT V PACKAGING AND DEPLOYING 12
Performance best practices – Android field service app – Active transactions – Mobile app development hurdles – Rendering – Deploying and hosting in server.

TOTAL: 60 PERIODS

OUTCOMES
At the end of the course, the student will be able to:
- Create a game prototype that mimics the mechanics and "game already exist".
- Create an original game prototype.
- Evaluate existing game technologies.
- Deploy their prototype in the testing environment.
- Recreate industry's best practices.

REFERENCES
1. Corke, P. (2017). Robotics, Vision, and Control: Fundamental Algorithms in MATLAB® second, completely revised (Vol. 118). Springer.
2. Hjorth, L., & Richardson, I. (2014). Gaming in Social, Locative, and Mobile Media. Springer.
3. Mukherjee, S. (2015). Video Games and Storytelling: Reading Games and Playing Books. Springer.
4. Willson, M., & Leaver, T. (Eds.). (2017). Social, Casual and Mobile Games: The Changing Gaming Landscape. Bloomsbury Publishing, USA.
5. Xu, X. (Ed.). (2014). Interdisciplinary Mobile Media and Communications: Social, Political, and Economic Implications: Social, Political, and Economic Implications. IGI Global.
6. Yan, Z. (Ed.). (2015). Encyclopedia of Mobile Phone Behaviour. IGI Global.

MV5019 SENSOR-BASED DATA COLLECTION AND MANAGEMENT L T P C
2 0 2 3

OBJECTIVES:
- To impart the fundamental aspects and principles of sensor technologies.
- To know the internals of the hardware and software components involved in the development of sensor enabled applications.
- To learn about the sensor processing units and their architectures.
- To gain knowledge about sensor application development.
- To evaluate the sensor-based applications.

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UNIT I INTRODUCTION TO SENSORS 12

Introduction to Sensors – Definition – Transduction principles – Anatomy of sensors – Interdisciplinary strategy – Sensor technology drivers – Trends in sensor development– Planning sensor technology research.

UNIT II SENSORS TYPES 12

IR sensors – Ultrasonic sensor -- Temperatures, humidity, proximity, moisture, LDR, Touch, PIR- Application development using sensor.

UNIT III SENORS IN AR\VR 12

System structure of augmented reality – Key technology in AR – 3D vision –Approaches to augmented reality – Alternative interface paradigms – Spatial AR – Input devices – 3D position trackers – Performance parameters – Types of trackers – Navigation and manipulation interfaces – Gesture interfaces – Types of gesture input devices – Output devices – Graphics display – Human visual system – Personal graphics displays – Large volume displays – Sound displays – Human auditory system - Holographic video.

UNIT IV PERSONAL GADGETS SENSORS 12

Mobile phone sensors, Laptop, Internet of Things (IoT) – Applications of sensor-based Smart Devices using IoT – Wireless sensor networks.

UNIT V CASE STUDIES 12

Medical Applications – Education, arts and entertainment – Military applications – Emerging applications – Applications in manufacturing – Applications in robotics – Information visualization –Wearable computing – Games.

TOTAL: 60 PERIODS

OUTCOMES

On completion of the course, the student will be able to:
1. Discuss the basic concepts of Sensors.
2. Design and develop the sensor based applications in different domains.
3. Design various models using sensors
4. Perform sensor programming with toolkits.
5. Understand the working principles of real time components that uses sensors.
6. Evaluate sensor-based applications.

REFERENCES

1. Grigore C. Burdea, Philip Coiffet, Virtual Reality Technology, Second Edition, Wiley India, 2006.
2. Charles Palmer, John Williamson, Virtual Reality Blueprints: Create Compelling VR Experiences for Mobile, Packt Publisher, 2018.
3. Kamal Kishor Jha, Getting Started with IoT, Evincepub Publication Limited, 2019.

OPEN ELECTIVE COURSES (OEC)

MP5491   NUCLEAR ENERGY IN HEALTH CARE AND INDUSTRY   L T P C
3 0 0 3

OBJECTIVES

- To provide the student about the action of radiation on living cells and the response.
- To make the student to understand the basic nuclear medicine physics and newer technology systems.
- To enable the students to understand the diagnostic and therapeutic nuclear medicine techniques.
- To provide a broad knowledge in radiation hazard evaluation and control

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UNIT I   BASICS OF NUCLEAR SCIENCE AND RADIATION EFFECTS   9

Radioactivity, nuclear reactions and interaction of ionizing radiation with matter, with emphasis on radiation detection, radiation shielding - photoelectric - Compton effect and pair production - biological effects on human health - Action of radiation on living cells - direct and indirect physical damage - Cell response to radiation - somatic and genetic radiation effects - Radiation side effects - Acute and chronic effects of low dose effects.

UNIT II   DIAGNOSTIC APPLICATIONS OF NUCLEAR ENERGY   9

Production of X rays and its applications X-ray radiography- CT scan -contrast studies in x ray imaging - fluoroscopic applications - Mammography - physics of nuclear medicine and nuclear imaging - radio isotopes in diagnosis of nuclear imaging - Tc-99m extraction-radiopharmaceuticals - scanning instruments and techniques.

UNIT III   THERAPEUTIC APPLICATION OF NUCLEAR ENERGY   9

Production of nuclear radiations- alpha, beta and gamma rays and X-rays -External radiation therapy - telecobalt unit and linear accelerators - and internal radiation therapy - Iridium -192 HDR brachy therapy unit - Therapeutic nuclear medicine.

UNIT IV   INDUSTRIAL APPLICATIONS OF NUCLEAR ENERGY   9

Industrial applications — Non-destructive testing - industrial radiography - tracing, gauging, Radiation sterilization of medical equipment - food preservation and other applications.

UNIT V   NUCLEAR RADIATION SAFETY MEASURES   9

Basic concepts of radiation protection standards – ICRP recommendations - systems of radiological protection - Optimization of protection and individual dos limits - Radiation dose to individuals from natural radioactivity in the environment and man- made sources - Evaluation of external and internal radiation hazards - effect of time, distance and shielding - radioactive waste disposal and transport of radioactive nuclides.

TOTAL: 45 PERIODS

OUTCOMES

After successful completion of the course
- Students will be able to handle radioactive source carefully for treatment purpose.
- will develop competence in radioactive waste disposal management
- Will be develop competency to face radiation emergency
- Students will develop critical thinking skills in radiation safety and protection.
- Will be able to safe guard the radioactive sources used in hospitals.

REFERENCES

1. W. R. Handee, Medical Radiation Physics, Year Book Medical Publishers Inc., London, 2003.
2. E. J. Hall, Radiobiology for Radiologists, J. B. Lippincott Co., Philadelphia, 2000.
3. W. N. Wagner, Principles of Nuclear Medicine, W. B. Saunders Co., London, 1990.
4. R. F. Mold, Radiation Protection in Hospitals, Adam Hilger Ltd., Bristol, 1985.
5. Fred A Mettler and Milton J Guiberteau, The essentials of nuclear Medicine imaging, 2011.

MP5492	SMART MATERIALS FOR ENERGY AND ENVIRONMENT APPLICATIONS	L T P C
		3 0 0 3

OBJECTIVES

- To provide fundamental understanding on smart and intelligent materials.
- To enhance students' understanding on the structure-property relationship.
- To enable students appreciate novel materials and their usage in current cutting edge technologies.

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UNIT I   BASICS OF SMART MATERIALS AND STRUCTURES   9

Introduction - components and classification of smart structures, Requirements of Intelligent Materials – Functions: Sensor, Memory, Processor, Actuator - Common smart materials - Applications of smart systems – Energy Harvesting systems: Regenerative braking - Smart polymers: Applications in drug delivery, tissue engineering. Biomimetics and bio-inspiration.

UNIT II   INTELLIGENT MATERIALS FOR ENERGY GENERATION   9

Artificial Intelligence in Materials, Ferrolectricity: Introduction - Piezoelectric effect, Piezoelectric materials as sensors, Actuators and bimorphs - Transparent Conducting Materials – Band-gap and electrical conductivity, Conditions for transparency – role of defects on conductivity - Applications: Solar cells, Touch screen, etc.

UNIT III   SHAPE MEMORY MATERIALS FOR ENERGY STORAGE   9

Introduction to structure types, Structure-property relationships, Shape memory effect (SME), One way and two-way SME, Shape memory alloys (SMAs), Intelligence in the form of SMA, Functional properties of SMAs. Thermal-storage, and aerospace materials. Shape-memory polymers, and their applications.

UNIT IV   MULTIFERROIC MATERIALS FOR NOVEL REFRIGERATION   9

Ferromagnetism and ferroelasticity, Magneto-electric materials: Types of magnetic ordering phenomena, Conditions for multiferroicity – Applications of multiferroic materials. Magnetostrictive smart materials – Magneto-caloric materials for emission-less refrigeration - Magneto-Optic (MO) Materials: Examples (Heusler alloys, double perovskites) and applications.

UNIT V   INTELLIGENT OPTICAL MATERIALS FOR ENVIRONMENT   9

Smart optical materials for modifying spectral shift and refractive index shift. Electro-optic and Acousto-optic materials: Definitions, examples and applications – Chromogenic Materials – Types: Photochromic, Thermochromic, Electrochromic - Devices and Applications: Radiation absorption.

TOTAL: 45 PERIODS

OUTCOMES

- The student will understand the working principle of smart materials
- The student will get an overview on various types of smart materials and their application areas.
- The student will get ideas to use smart materials in green energy and environment applications
- The student will get motivated to find novel applications of these multifunctional materials in new technologies.
- The student will get an idea on different synthesis and characterization techniques

REFERENCES

1. D.J. Leo, Engineering Analysis of Smart Material Systems, Wiley 2007.
2. M. Addington, D.L. Schodek, Smart Materials and New Technologies, Elsevier 2005.
3. K. Otsuka, C.M. Wayman (Eds.), Shape Memory Materials, Cambridge University Press, 1998.
4. M.V. Gandhi, B. S. Thompson, Smart Materials and Structures, Springer, 1992.
5. P. Ball, Made to Measure: Materials for the 21stCentury, Princeton University Press, 1997.
6. Ed. M. R. Aguilar and J.S. Roman, Smart Polymers and their Applications, Elsevier 2014.
7. Ed.: Peter L. Reece, Smart Materials and Structures: New Research, Nova Science 2007.
8. Ian Baker, Fifty Materials that Make the World, Springer, 2018.
9. Ed.: Mel Schwartz, Smart Materials, CRC Press, 2008.

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EA5491   **CLIMATE JOURNALISM**   **L T P C**
                                                                 3 0 0 3

OBJECTIVES
- To offer a comprehensive approach to reporting climate change.
- To impart knowledge about political, economic, and ethical questions raised by the need for transformative change of societies in the wake of climate change.
- To reflect on the development of climate change as an issue of nature and society.
- To synthesize knowledge from different areas related to climate change.
- To reflect on the norms and values of journalism in the context of climate change.

UNIT I   HUMAN INFLUENCES   9
Anthropocene Era (anthropo: man, and cene: new) - Freshwater scarcity - The decline of our oceans, fish, and wildlife - Environmental health - Sustainable energy, agriculture, and food systems – Role and responsibility of journalists – Making climate change relevant as a society issue – Politics and economics of climate change – Environmental ethics – Human health – Species migration.

UNIT II   PUBLIC NARRATIVES   9
Complex science and uncertainty - Public apathy and politics - Well-funded counter-narratives - Zealous stakeholders - What can (incorrectly) appear due to a lack of news hook for stories - Two centuries of CO_2 emissions.

UNIT III   JOURNALISTIC CHALLENGES   9
Environmental Journalism as a craft - Roles and differences between journalism and communications – Finding the most accurate, credible and timeliest information on science and issues – Essentials of environmental reporting – Discerning uncompromised expert sources – Using human narratives and descriptive storytelling to relate real-world impact – Tapping the databases, records and other tools commonly used by environmental reporters.

UNIT IV   CLIMATE ISSUES   9
The lack of diversity in environmental journalism – "Junk science" – Battling climate denial - Covering GMOs – The problem of doomsday climate reporting – Digital security for journalists and researchers etc.

UNIT V   JOURNALISTIC SKILLS   9
Hands-on journalistic series – Reporting, developing, funding, crafting and publishing environmental stories – Writing diverse stories on environmental history, a wildlife or ocean story, a clam-aquaculture story, a work of nature writing, etc. – A polished, fact-checked, final story with questions answered and edits made from the first draft and at least two added elements such as photos, audio or video clips, graphics, timelines or others to draw people in.

TOTAL: 45 PERIODS

OUTCOMES
- Students will understand the importance of climate issues.
- Students will understand the various aspects of climate change and its effect in society.
- Students will learn to cover the climate change issues.
- Students will understand the need of journalistic skills for covering climate issues.
- Students will learn the various strategies, approaches on covering climate issues in various media.

REFERENCES
1. Lakoff, G., Why it matters how we frame the environment. In Environmental Communication, 2010.
2. Vetlesen, A. J., Nature, technology and environmental crisis. In Bhaskar, R., Næss, P., Høyer, K.G. (eds.), Eco philosophy in a World of Crisis. Critical Realism and the Nordic Contributions. London: Routledge, 2012.
3. Ytterstad, A., The climate crisis challenges the objectivity ideal in Norwegian journalism. In Ytterstad. A., Norwegian Climate Change Policy – Between Hegemony and Good Sense, Oslo: Unipub, 2012.

4. Anker, Peder, A pioneer country? A history of Norwegian climate politics. In Climatic Change. ISSN 0165-0009. 2016.
5. Klein, N., This Changes Everything - Capitalism vs the Climate. Part 1 and 3. London: Allan Lane, 2014.
6. Stoknes, P.E., What We Think About When We Try Not to Think About Global Warming: Toward a New Psychology of Climate Action. Vermont: Chelsea Green, 2015.

EA5492   **DIGITAL PHOTOGRAPHY**   **L T P C**
                                                                          3 0 0 3

OBJECTIVES
- To create opportunities for professional and creative expression through the practice and art of photography.
- To inculcate aesthetic sense involved in creativity.
- To get to know the genres of photography

UNIT I   CAMERA   9
Different camera formats, working of an SLR, DSLR and Mirrorless Cameras. Features and functions of SLR and DSLR Cameras. Various camera controls. Ansel Adams Zone system. Exposure. Image sensors. Different storage formats.

UNIT II   LENS AND ELEMENTS OF PHOTOGRAPHY   9
Different type of Lenses - Basic Shots and Camera Angles, Photographic Composition - View point and Camera angle-Eye Level, Low and High, Balance- Aspects of Balancing, Shapes and Lines, Pattern, Volume, Lighting, Texture, Tone, Contrast- and Colour, Framing, various Perspectives.

UNIT III   COLOUR AND LIGHTING   9
Colour Theory, Colour Temperature, Electromagnetic spectrum, Lighting Philosophies – Basic styles of Lighting – Properties of Light – Additive and Subtractive Light – Contrast and Lighting Ratios – Direct and Indirect Light – Three point and Five Point Lighting – Light Sources. Light meters and filters

UNIT IV   PEOPLE AND PORTRAIT PHOTOGRAPHY   9
Indoor and outdoor lighting techniques for portraits, the Casual Portrait, Environmental Portraits, Group Portraits, Familiar Subjects, Hands and Other Details.

UNIT V   GENRES OF PHOTOGRAPHY   9
Basic shooting and Lighting Techniques and Equipment required for different genres of Photography like Black and White, Landscape, Cityscape, Architecture, Advertising, Table top photography Fashion, Food, Automobile, Sports, Travel, Children, Portrait, wild life, Still Life, Event, Silhouette, Festival and Themes.

                                                              TOTAL: 45 PERIODS

OUTCOMES
- Students will be able to utilize the principles of good composition in photography.
- Students will be able to develop an individual style in representing the society through photographs.
- Students will have a thorough understanding of how to create visual variety
- Students will understand the foundation principles of design
- Students will gain understanding in Depth of field
- Students will understand the different genres of photography.

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REFERENCES
1. Ansel Adams, The Negative, Bulfinch press, Fourteenth Edition, 2008.
2. Balakrishna Aiyer, Digital Photojournalism, Authors press, 2005
3. Ben long, Complete Digital Photography, Charles River Media, Third Edition, 2005
4. Fil Hunter, Steven Biver, Paul Fuqua, Light - Science & Magic: an Introduction to Photographic Lighting, Focal Press,2007
5. Langford Bilissi, Langford's Advanced Photography, focal press, Seventh Edition, 2008.
6. Scott Kelby, The Digital Photography Book, Peachpit Press, 2009.

AC5491	GREEN CHEMISTRY	L T P C
		3 0 0 3

OBJECTIVES
- To introduce the basic concept and principles of green chemistry for environmental management.
- To make the students know about green reagents and its importance to the environment
- To acquaint the student with green solvents and its impacts in green chemistry
- To familiarize the synthesis of materials using green methods
- To impart the knowledge on applications of green synthesis technology

UNIT I   PRINCIPLES OF GREEN CHEMISTRY   9
History of green chemistry and sustainability- Prevention of waste/by-products – maximum incorporation of reactants in final product-Atom economy – Prevention/minimization of hazardous products – Designing safer chemicals – optimizing reaction conditions.

UNIT II   GREEN REAGENTS AND CATALYSTS   9
Choice of starting materials – reagents (Dimethyl carbonate, polymer supported reagents) – catalysts (microencapsulated Lewis acids, zeolites, basic catalysts polymer supported catalysts, introduction to biocatalysts).

UNIT III   GREEN SOLVENTS   9
Aqueous phase reactions (Claisen rearrangement, Aldol condensation, wurtz reaction, reduction of carbon carbon double bond, oxidation of amines into nitro compounds – Electrochemical synthesis (synthesis of adiponitrile) - Ionic liquids – reactions in acidic ionic liquids- reactions in neutral ionic liquids (hydrogenations, diels - Alder reactions, Heck reactions, O-alkylation and N-alkylation, methylene insertion reactions.

UNIT IV   GREEN SYNTHESES   9
Microwave induced green synthesis (Hoffmann Elimination and Oxidation of alcohols) – Ultra sound assisted green synthesis (Esterification, Saponification and Cannizaro reaction) – Solid state green synthesis (Dehydration of alcohols to alkenes, Grignard reaction)- Solid supported organic synthesis (Synthesis of furans and pyrrole)

UNIT V   APPLICATIONS OF GREEN SYNTHESIS   9
Introduction – synthesis of styrene, adipica acid, catechol, 3-Dehydroshikimic acid, methyl methacrylate, urethane. Environmentally benign synthesis of aromatic amines – free radical bromination – synthesis of ibuprofen and paracetamol.

TOTAL: 45 PERIODS

OUTCOMES
- To be familiar with basic concepts of green chemistry and apply to them in various field
- To recognize the catalytic reaction with green reagents and its importance. To identify available green solvents and apply them to various synthesis process

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- To recognize the preparations of materials with green process and its application to the environment.
- To gain the knowledge of preparation of various drugs using green synthesis methods
- To be have the skills and technology towards green chemistry and apply in industry.

REFERENCES

1. V.K. Ahluwalia and M. Kidwai, New trends in Green Chemistry, Anamaya Publishers, 2004.
2. V. K. Ahluwalia, Green Chemistry, Narsoa Publishers, 2012
3. Bela Torok and Timothy Dransfield, Green Chemistry, An Inclusive Approach, 1st Edition, Elsevier, 2017.

AC5492	FOOD CHEMISTRY	L T P C
		3 0 0 3

OBJECTIVES

- To enable the students to acquire knowledge on the macro and micro constituents of the food
- To know the structure and chemical characteristics of constituents of food.
- To demonstrate the knowledge of food chemistry and applying, the principles and concepts of chemistry as they apply to food systems.
- To familiarize the student with the relationship between water and food.
- To explain the rationale for certain food processes and preservation

UNIT I INTRODUCTION TO FOOD AND ITS PROPERTIES 12

Proteins - Enzymes - Chemistry and structure, kinetics, Maillard reaction. Food carbohydrates: Structural, nutritional and functional aspects. Emulsifiers - role of emulsifiers selection of emulsifier based on hydrophilic and Lipophilic balance (HLB) and its application. Thickeners-definition, chemical structure, gel formation, list of permitted thickeners and food application. Chemical and biochemical changes: changes occur in foods during different processing.

UNIT II PROCESSING AND PRESERVATION 12

Scope and benefits of industrial food preservation. Preservation of foods by chemicals, antibodies, antioxidants, salt and sugar. Principles of food freezing: freezing point of foods Psychrometric chart, Freeze concentration, freeze drying, IQF. Nanotechnology: Principles and application in foods, Hurdle technology: Types of preservation techniques and their principles, concept of hurdle technology and its application.

UNIT III FLAVOURS AND COLOURING AGENTS 9

Chemistry of food flavor, definitions, Flavourmatics / flavouring compounds, flavor retention-off flavours and food taints. Colour -Natural and synthetic food colours, their chemical structure, stability, permitted list of colours, usage levels and food application.

UNIT IV WATER RELATIONS IN FOOD 6

Moisture in food: Structure, properties, Types of water in food and their specific function water activity and stability.

UNIT V FOOD ADDITIVES 6

Definitions, uses and functions of: Acids, Bases, Buffer system, chelating/sequestering agents, Antioxidants, Anti-caking agents, Firming agents. Flour bleating agents and Bread improvers. Anti-microbial agents/ class I & II.

TOTAL: 45 PERIODS

OUTCOMES

- Will know about the factors governing the food quality and chemical constituents.
- Will be able to name and describe the general chemical structures of the major components of foods and selected minor components
- Will come to know about the techniques involved in food processing and preservation

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- Will be acquitted with food additives and their function in preservation
- Will be familiarize with the nature of packed food from industrial processes

REFERENCES

1. Damodaran, S., Parkin, K. L., and Fennema, O.R. (2008) Fennema's Food Chemistry 4thEdition, CRC Press
2. Belitz, H-D., Grosch, W. & Schieberle, P. (2004) Food Chemistry 3rd Ed. (translation of fifth German edition), Springer
3. DeMan, J.M. Principles of Food Chemistry 4rd Ed. Aspen Publishers (2018)
4. Peter C. K. Cheng, Handbook of Food Chemistry, Vol 1, Springer Reference, 2015
5. Jaswinder Kaur and Barry H. Grump Fundamentals of Food Chemistry, Abhizeet Publications, 2010.
6. Harish Kumar Chopra and Parmjit Singh Panesar, Food Chemistry, Narosa Publication, 2010.

AG5491	NATURAL HAZARDS AND MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES
- To understand natural hazards.
- To learn mitigation methods for natural hazards.
- To provide knowledge on assessment and management of natural hazards.

UNIT I   DISASTER PHENOMENON   9
Disaster threat - characteristics-parameters – mapping aspects for earthquake, landslides, tsunami, cyclones, flood, drought and epidemics.

UNIT II   MITIGATION   9
Geological and hydrological hazards - Reduction of hazard proneness – reducing structural vulnerability – changing the functional characteristics of settlement – building code provisions.

UNIT III   ASSESSMENT   9
Elements of risk – vulnerability analysis on dam and other infrastructures – risk assessment – plan area – organizational aspects, planning and mapping levels – socio-economic aspects – cost of risk reducing measures.

UNIT IV   MANAGEMENT   9
Prevention – preparedness – response – recovery – resource utilization – international assistance – policy and legislation – training – public awareness.

UNIT V   CASE STUDIES AND ADVANCED TOOLS   9
Post disaster review – role of remote sensing and GIS – National and state level case studies on various disasters.

TOTAL: 45 PERIODS

OUTCOMES
On completion of this course, the students expected to be able to:
- Gain knowledge on natural hazards and their characteristics
- Have better understanding on geological and hydrological hazards
- Appreciate various mitigation techniques.
- Carryout risk assessment and vulnerability mapping
- Understand the role of remote sensing and GIS in natural hazard risk reduction.

REFERENCES

1. Nick Carter, W. Disaster management, A Disaster manager's Handbook, Publisher: Asian development bank, Manila, 1992.

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2. Mitigating natural disasters: Phenomena, effects and options, a Manual for policy makers and planners. Publisher: United Nations, Hew York, 1991.
3. EdwardA. Keller, DeVecchio. Natural Disasters: Earth's Processes as Hazards, Disasters and Catastophes, Routledge, 3rd Edition, 2011.
4. Harsh K. Gupta, Disaster Management, Indian National Science Academy, ISBN 8173714568,788173714566, 2006 second Edition, 152 Pages.
5. Ghanshyam Singh and Sandip Bhandari, Disaster Management, Gullybaba Publishing House (P) Ltd; 1st edition (2012), ISBN-13: 978-9381066492.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√	√	√	√	√	√	√	√	√	√	√	√
CO2	√		√	√	√	√	√	√	√	√	√	√
CO3	√	√	√	√	√	√	√	√	√	√	√	√
CO4	√	√	√	√		√	√	√		√	√	√
CO5	√		√	√	√	√				√		√

AG5492   **OCEAN RESOURCES AND EXPLORATION TECHNIQUES**   **L T P C**
                                                                   3 0 0 3

OBJECTIVES
- To understand the Sources of Marine Minerals.
- To understand the various energy resources pertain to marine system
- To understand the importance and economic aspects of marine minerals

UNIT I   INTRODUCTION TO OCEANS   9
Marine Mineral Resources - sources of Marine Minerals -sources in ocean basins. Formation Processes of Polymetallic Sulfides (PMS) on the Ocean Floor- Plate boundaries and associated mineral and energy occurrences.

UNIT II   OCEAN RESOURCES   9
Mineral deposits derived from land sources- Placer Deposits - Lime, Phosphorite and Salt Deposits - Beach Deposits of Continental Margins - rock salt (sodium chloride) - magnesium metal - magnesium compounds and bromine. metalliferous sediments-Seafloor Polymetallic Massive Sulphides - polymetallic manganese nodules. Methane hydrate.

UNIT III   ENERGY RESOURCES   9
Wind Energy - Wave Energy - Tidal Energy - Ocean Current Energy - Ocean thermal energy conversion (OTEC) - osmotic power plant-Petroleum resources and radioactive nuclear mineral deposits

UNIT IV   OCEAN RESOUCE EXPLORATION AND EXPLOITATION   9
Marine sampling - Water Samplers - Bottom Samplers - Instrumentation

UNIT V   OCEAN MINERAL MINING   9
Mining aspects of deep-sea polymetallic sulphides - Manganese Nodules - Methane Hydrates. Sand, Sand Mining & Beach replenishment-Marine maps of Exclusive Economic Zone (EEZ)

                                                            TOTAL: 45 PERIODS
OUTCOMES
- Students will understand the various sources of marine minerals.
- Students will able to understand the Mineral deposits derived from land sources.
- Students will learn about the energy resources of marine system.
- Students will learn about various sampling methods and instrumentation.
- Students will able to understand the economic aspects of marine minerals.

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REFERENCES
1. H. Kunzendorf, Marine Mineral Exploration, Volume 41, 1st Edition, Elsevier Science, 1986
2. David Spencer Cronan, Handbook of Marine Mineral Deposits, CRC Press, 24-Nov-1999
3. Yves Fouquet, Denis Lacroix, Deep Marine Mineral Resources, 2014th Edition, Springer Dordrecht Heidelberg London New York
4. H. Kunzendorf, Marine Mineral Exploration, ISBN-10: 0444426272, Elsevier Oceanography Series

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√	√	√	√	√	√	√	√	√	√	√	√
CO2	√		√	√	√	√	√	√	√	√	√	√
CO3	√	√	√	√	√	√	√	√	√	√	√	√
CO4	√	√	√	√		√	√	√	√	√		√
CO5	√		√	√	√	√	√		√	√	√	

MC5491   BASIC CRYSTALLOGRAPHY AND CRYSTAL GROWTH   L T P C
                                                                          3 0 0 3
OBJECTIVES
- To introduce the basics of crystal symmetry and crystal structures.
- To provide students with a background to X-ray generation and detection
- To provide instruction on the steps involved in single crystal structure determination
- To teach the concept of powder X-ray diffraction and its applications
- To teach various crystal growth techniques

UNIT I   CRYSTAL SYMMETRY AND STRUCTURES   9
Crystalline and non-crystalline materials — symmetry: symmetry operations, symmetry elements - translational symmetries - point groups - space groups – equivalent positions - space lattice - crystal systems – Bravais lattices – crystal directions - crystal planes – Miller indices- interplanar spacing – coordination number– atomic radius – atomic packing factor of SC, BCC, FCC and HCP structures – linear density – planar density – close packed structures.

UNIT II   X-RAYS   9
X-rays - generation of X-rays - sealed tube and rotating anode generators – synchrotron radiation – continuous and characteristic X-rays - X-ray absorption – X-ray monochromators – collimation – Soller slits - X-ray detectors (principles only)

UNIT III   SINGLE CRYSTAL STRUCTURE DETERMINATION   9
Diffraction by X-rays - Bragg's law – reciprocal lattice and Ewald sphere – atomic scattering factor - intensities of diffracted X-rays -– Single crystal X-ray diffractometers – measurement of intensities – systematic absences – space group determination - factors affecting X-ray intensities – data reduction – solving the structure - phase problem in crystallography – direct methods – refining the structure – results - geometrical parameters.

UNIT IV   POWDER X-RAY DIFFRACTION   9
X-ray diffraction by polycrystalline materials - formation of powder diffraction patterns - Debye-Scherrer camera – powder X-ray diffractometer – diffractograms – sample holders – sample preparation – orientation of crystallites – sample rotation – diffraction geometries – indexing of powder pattern – applications of powder diffraction.

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UNIT V   CRYSTAL GROWTH TECHNIQUES   9

Bridgman technique - Czochralski method - Verneuil technique - zone melting – Gel growth – solution growth methods – Low and high temperature solution growth methods – Vapour growth - Epitaxial growth techniques - LPE – MOCVD – MPE.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course the students will

- understand crystal symmetry, crystal planes and simple crystal structures
- gain a knowledge of X-ray generation, absorption, monochromatization and detection
- get a working knowledge of single crystal structure determination
- get some insight into the powder diffraction and its applications
- be able to understand the basics of various crystal growth techniques

REFERENCES

1. Tareen, J.A.K. and Kutty, T.R.N. A Basic course in Crystallography. University Press, 2001.
2. Cullity, B.D. and Stock, S.R. Elements of X-ray Diffraction. Pearson, 2014.
3. Stout, G.H. and Jensen, L. X-ray Structure Determination, A Practical Guide. Macmillan: New York, 1989.
4. Woolfson, M.M. An Introduction to X-ray Crystallography. Cambridge University Press, New York, 1997.
5. Bhat, H.L. Introduction to Crystal Growth: Principles and Practice. CRC Press, 2014.

MC5492	NONLINEAR SCIENCE	L T P C
		3 0 0 3

OBJECTIVES

- The students will be introduced to the basics of nonlinear dynamics and its applications.
- The students will learn about the mathematical models needed to study the concepts of fixed points, oscillations, bifurcations and integrability.
- The students will know about the nonlinear dynamical phenomena in chemical systems.
- The students will understand the importance of nonlinear dynamics in biological systems.
- The students will be introduced to the concepts of nonlinear dynamical analysis in geological systems.

UNIT I   NONLINEAR DYNAMICS   9

Dynamical systems - linear systems - importance of nonlinearity - nonlinear dynamical systems - Autonomous and non-autonomous systems - phase-space, flows and limit sets. Classification of equilibrium points in planar systems – periodic and chaotic motions - fractals - pattern formation - cellular automata - self-self-organised criticality - networks - stochastic resonance.

UNIT II   MATHEMATICAL MODELS   9

First-order differential equations - separation of variables - slope fields - Euler's method - equilibria and phase plane - bifurcations - higher-order equations - trace-determinant plane - harmonic oscillators - equilibrium point analysis - non-autonomous systems and chaos - finite dimensional integrable systems - dispersive systems - solitary waves - solitons - analysis of soliton solutions.

UNIT III   CHEMICAL SYSTEMS   9

Chemical oscillations - waves and patterns - transport and external field effects - polymer systems - coupled oscillators - Turing patterns - stirring and mixing effects - Briggs-Rauscher reaction - Belousov-Zhabotinsky reaction - BZ waves - propagating pH front - chemical clocks.

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UNIT IV   BIOLOGICAL SYSTEMS   9

Biological oscillators - excitable systems - neuronal systems: HH equations - FN equations - physiological control systems - dynamics of bone remodelling - dynamics of nucleic acids: Protein complexes - patterns in biological membranes - cell replication and control - pupil light reflex - dynamical analysis of human tremor - fractals in living organisms.

UNIT V   GEOLOGICAL SYSTEMS   9

Computational models of earthquakes - earthquake processes - multi fractals in geosciences - entropy analysis of seismicity - tectonics - spatial distribution of earthquakes - volcanic eruptions -short and long range interactions - RJB model - precursory dynamics - landscape dynamics - dynamics of earth's magnetosphere. Snow avalanches and system model - geomorphology: drainage networks, fractal trees, growth models, diffusion-limited aggregation.

TOTAL: 45 PERIODS

OUTCOMES
After completing this course, the students should able to
- Understand the basics of nonlinear dynamics and its applications.
- Gain knowledge on the concepts of fixed points, oscillations, bifurcations and integrability.
- Appreciate the importance of nonlinear dynamical phenomena in chemical systems.
- Understand the role of nonlinear dynamics in biological systems.
- Apply nonlinear dynamical analysis for geological systems.

REFERENCES
1. M. Lakshmanan and S. Rajasekar. Nonlinear Dynamics: Integrability Chaos and Patterns. Springer-Verlag, 2003
2. M. Lakshmanan and K. Murali. Chaos in Nonlinear Oscillators. World Scientific, Singapore, 1996.
3. S.H.Strogatz. Nonlinear Dynamics and Chaos. CRC Press, 2014.
4. Paul Blanchard, R.L. Devaney and G.R. Hall. Differential Equations. Brooks/Cole, 2012.
5. Irving R. Epstein and J.A. Pojman. An Introduction to Nonlinear Chemical Dynamics. Oxford University Press, 1998.
6. Anne Beuter, Leon Glass, M.C. Mackey and M.S. Titcombe. Nonlinear Dynamics in Physiology and Medicine. Springer, 2003.
7. Donald L. Turcotte. Fractals and Chaos in Geology and Geophysics. Cambridge University Press, 1997.

PROGRESS THROUGH KNOWLEDGE
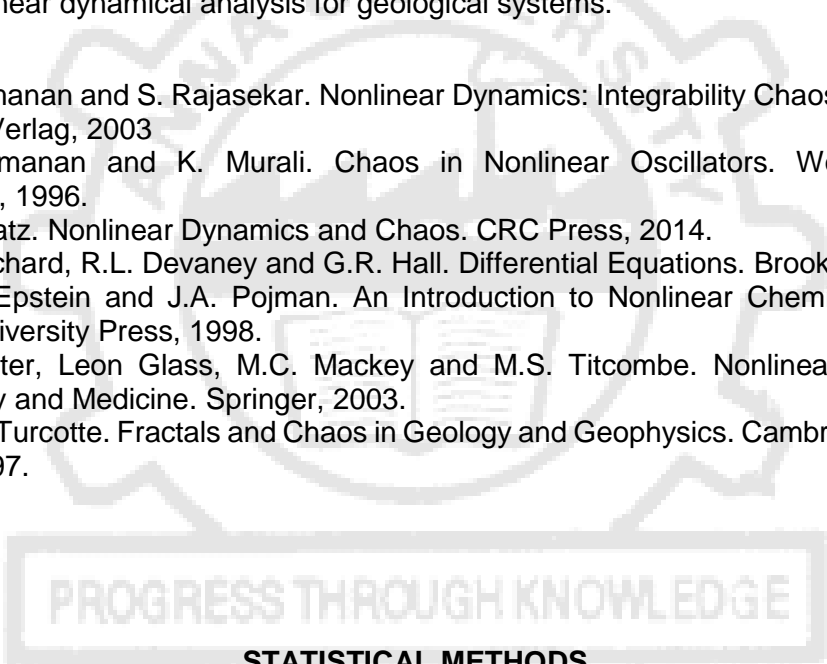
MT5491	**STATISTICAL METHODS**	**L T P C**
		3 0 0 3

OBJECTIVES
- To organize and describe the data and hence compute the various descriptive measures
- To give an idea of testing the statistical hypothesis claimed based on a set of data points using standard sampling distributions
- To expose to the basic principles of experimental design and hence carry out the analysis of variance
- To use non parametric methods on data sets which are not from normally distributed population
- To prepare the students to implement the various concepts in statistics using R statistical tool

UNIT I   DESCRIPTIVE STATISTICS   9

Frequency distribution - Graphs of frequency distribution - Descriptive Measures - Quartiles and Percentiles - Calculation of sample mean and population mean
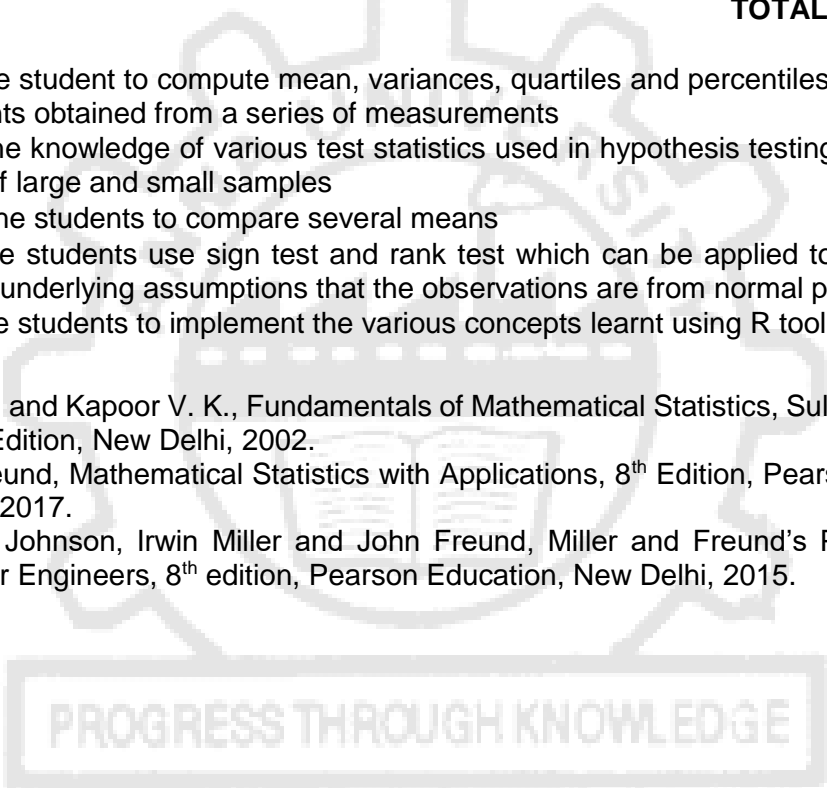
UNIT II   HYPOTHESIS TESTING   9
Sampling Distributions- Central Limit Theorem - Testing a Statistical Hypothesis - Tests Concerning Means and variances - Independence of Attributes - Goodness of Fit

UNIT III   ANALYSIS OF VARIANCES   9
One way and two way classification - Completely Randomized Design - Randomized Block Design - Latin Square Design

UNIT IV   NONPARAMETRIC METHODS   9
Sign Test - Wilcoxon's Signed Rank Test - Rank Sum Tests - Tests of Randomness - Kolmogrov Smirnov and Anderson Darling Tests

UNIT V   CALCULATIONS USING R   9
Classification and tabulation of data - Graphical representation - Calculation of central tendency and dispersion of data - Implementation of skewness, moments and kurtosis - Hypothesis Testing - Implementation of ANOVA, sign test and rank sum test.

TOTAL: 45 PERIODS

OUTCOMES
- It equips the student to compute mean, variances, quartiles and percentiles for a large set of data points obtained from a series of measurements
- It imparts the knowledge of various test statistics used in hypothesis testing for mean and variances of large and small samples
- It enables the students to compare several means
- It makes the students use sign test and rank test which can be applied to any raw data without the underlying assumptions that the observations are from normal population.
- It equips the students to implement the various concepts learnt using R tool for statistics

REFERENCES
1. Gupta S. C. and Kapoor V. K., Fundamentals of Mathematical Statistics, Sultan Chand and Sons, 11th Edition, New Delhi, 2002.
2. John E. Freund, Mathematical Statistics with Applications, 8th Edition, Pearson Education, New Delhi, 2017.
3. Richard A. Johnson, Irwin Miller and John Freund, Miller and Freund's Probability and Statistics for Engineers, 8th edition, Pearson Education, New Delhi, 2015.

PROGRESS THROUGH KNOWLEDGE

HS5491	PROFESSIONAL EMAIL COMMUNICATION	L T P C
		3 0 0 3

UNIT I   Email as a medium of professional communication (1 hour)
- a. Clear, grammatically correct sentences
- b. Clear and coherent paragraphs
- c. Polite and professional expression
- d. Accurate punctuation

The nature of the e-mail in its present technological state
- a. The pros and cons of using email for professional communication

UNIT II   Standard email conventions and etiquette
- a. Conventions for effective emailing intra and inter workplaces(inclusive of formatting)
- b. Interpersonal etiquette to be used in professional emailing
- c. Cross- cultural dos and don'ts when using email across borders

Attested

UNIT III   Understanding email messages accurately (2 hours)
   a. Understanding the core message
   b. Understanding the writer's intention and expectation accurately
   c. Interpreting the style ad tone of the message
   d. Reading and understanding messages quickly

UNIT IV   Writing clear and contextually appropriate responses (12 hours)
   a. Writing appropriate opening and closing sentences
   b. Structuring the email logically and coherently
   c. Positioning the core message for reader attention and action
   d. Writing messages for a range of professional functions such as giving an update, reporting, requesting, clarifying and confirming, giving instructions etc.

UNIT V   Using a range of professional styles (10 hours)
   a. Maintaining courtesy and professional poise in all messages
   b. Being direct or indirect as necessary
   c. Being elaborate or brief as necessary
   d. Being assertive and decisive when needed

                                                                TOTAL: 45 PERIODS

Learning outcome: At the end of the course, the students should
- Understand email as a professional communication medium and as it is used in workplaces today.
- Use standard e-mailing conventions and etiquette used in workplaces internationally.
- Use appropriate style and tone for communicating a variety of professional messages that are generally communicated via e-mail in work and business communication.
- Read and interpret e-mail messages accurately and write contextually appropriate responses.
- Use English accurately while writing emails in generic professional contexts.
- Use punctuation accurately while writing e-mail messages.

   Assessment (with individualised feedback for mid-course tests):

      Mid-course Assessment -1hour + 1 hour for feedback after evaluation)
      Mid-course Assessment -2 (1 hour + 1 hour for feedback after evaluation)
      Final Assessment – 2 hours (inclusive of Email English test)

Classroom teaching methodology: Concept familiarisation will be accompanied with practice in generic professional emailing contexts. Practice tests and individualised feedback will be used feedback.

Material for the course will be teacher generated

HS5492	PROJECT REPORT WRITING	L T P C
		3 0 0 3

OBJECTIVES

The Course aims to:
- Develop project writing skills
- Give engineering and technology students practice in writing a project report   Attested
- Enhance their awareness on the importance of report writing in the professional context

UNIT I   WRITING

Writing Skills – Essential Grammar and Vocabulary – Passive Voice, Reported Speech, Concord, Signpost words, Cohesive Devices – Paragraph writing - Technical Writing vs. General Writing

UNIT II   REPORT WRITING

Project Report – Definition, Structure, Types of Reports, Purpose – Intended Audience – Plagiarism – Report Writing in STEM fields – Experiment – Statistical Analysis

UNIT III   PROJECT REPORT

Structure of the Project Report: (Part 1)Framing a Title – Content – Acknowledgement – Funding Details -Abstract – Introduction – Aim of the Study – Background - Writing the research question - Need of the Study/Project Significance, Relevance – Determining the feasibility – Theoretical Framework

UNIT IV   STRUCTURE OF REPORT

Structure of the Project Report: (Part 2) – Literature Review, Research Design, Methods of Data Collection - Tools and Procedures - Data Analysis - Interpretation - Findings –Limitations - Recommendations – Conclusion – Bibliography

UNIT V   PROOF READING

Proof reading a report – Avoiding Typographical Errors – Bibliography in required Format – Font – Spacing – Checking Tables and Illustrations – Presenting a Report orally – Techniques

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course students will be able to,
- Write reports successfully
- Analyze issues threadbare and arrive at findings based on the analysis
- Write reports for different purposes

REFERENCE BOOKS:

1. Gerson and Gerson. Technical Communication: Process and Product, 7th Edition, Prentice Hall, 2012
2. Virendra K. Pamecha - Guide to Project Reports, Project Appraisals and Project Finance, 2012.
3. Daniel Riordan.- Technical Report Writing Today, 1998.
4. Darla-Jean Weatherford. Technical Writing for Engineering Professionals. Penwell Publishers, 2016.

HS5493   **BASIC PRESENTATION SKILLS**   **L T P C**
                                                                        3 0 0 3

OBJECTIVES

The course aims to:
- Develop public speaking skills among students of engineering and technology
- Enhance the presentation skills of students
- Heighten the awareness related to the fundamentals of presentations

UNIT I   PRESENTATION SKILLS

Presentation skills – Characteristics of an effective Oral Presentation – Audience - Context, Content, Speaker Status - Purpose – Modus Operandi – Extempore

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UNIT II   PRESENTATION DO S AND DON'TS

Emphasis on syllable stress, pronunciation, intonation, pauses, pace - Preparation for a presentation – Avoiding plagiarism – Ample use of Referencing skills – Efficient ways of Collecting and Collating data (due emphasis on important information)

UNIT III   STRUCTURE

Impressive introduction – Body language – Use of icebreakers – "Start Proper" for the presentation – Relevant Anecdotes & Jokes - Responding constructively to questions – Time Management – Information sharing

UNIT IV   TIME MANAGEMENT

Impressive introduction – Body language – Use of icebreakers – "Start Proper" for the presentation – Relevant Anecdotes & Jokes - Responding constructively to questions – Time Management – Information sharing

UNIT V   GROUP PRESENTATION

Presentation skills – Guidelines – Group Presentation- Creative approaches to presenting – Technical presentation - Speaking under time constraint – variations in pitch, tone & intonation - Credibility in presentation (Use of authentic data/information) Podium panache – Effective Delivery

TOTAL: 45 PERIODS

REFERENCES
1. Michael Osborn, Susan Osborn, Randall Osborn & Kathleen J Turner, Public Speaking: Finding Your Voice, 10th Edition, Pearson, 2012.
2. John Hughes & Andrew Mallett, Successful Presentations DVD & Student's Pack, OUP, Oxford, 2012.
3. Nancy Duarte, Resonate: Present Visual Stories That Transform Audiences, John Wiley & Sons, New Jersey, 2010.
4. Scott Berkun, Confessions of a Public Speaker, O'Reilly Media, Inc, Canada, 2010.
5. Barbara Pease & Allan Pease, The Definitive Book of Body Language, Bantum Books, New York, 2006.
6. Naomi Karten, Presentation Skills for Technical Professionals: Achieving Excellence (Soft Skills for IT Professionals), IT Governance Publishing, UK, 2010.

AUDIT COURSES (AC)

AX5091	ENGLISH FOR RESEARCH PAPER WRITING	L T P C
		2 0 0 0

OBJECTIVES
- Teach how to improve writing skills and level of readability
- Tell about what to write in each section
- Summarize the skills needed when writing a Title
- Infer the skills needed when writing the Conclusion
- Ensure the quality of paper at very first-time submission

UNIT I   INTRODUCTION TO RESEARCH PAPER WRITING   6

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT II   PRESENTATION SKILLS   6
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts,

UNIT III   TITLE WRITING SKILLS   6
Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check

UNIT IV   RESULT WRITING SKILLS   6
Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.

UNIT V   VERIFICATION SKILLS   6
Useful phrases, checking Plagiarism, how to ensure paper is as good as it could possibly be the first- time submission

TOTAL: 30 PERIODS

OUTCOMES
CO1 –Understand that how to improve your writing skills and level of readability
CO2 –Learn about what to write in each section
CO3 –Understand the skills needed when writing a Title
CO4 – Understand the skills needed when writing the Conclusion
CO5 – Ensure the good quality of paper at very first-time submission

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										✓		✓
CO2										✓		✓
CO3										✓		✓
CO4										✓		✓
CO5										✓		✓

REFERENCES
1. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011
2. Day R How to Write and Publish a Scientific Paper, Cambridge University Press 2006
3. Goldbort R Writing for Science, Yale University Press (available on Google Books) 2006
4. Highman N, Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book 1998.

AX5092   **DISASTER MANAGEMENT**   **L T P C**
                                                                          2 0 0 0

OBJECTIVES:
- Summarize basics of disaster
- Explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Develop the strengths and weaknesses of disaster management approaches

Attested

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UNIT I INTRODUCTION TO DISASTER 6

Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

UNIT II REPERCUSSIONS OF DISASTERS AND HAZARDS 6

Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

UNIT III DISASTER PRONE AREAS IN INDIA 6

Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

UNIT IV DISASTER PREPAREDNESS AND MANAGEMENT 6

Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological And Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT V RISK ASSESSMENT 6

Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival

TOTAL: 30 PERIODS

OUTCOMES

CO1: Ability to summarize basics of disaster

CO2: Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.

CO3: Ability to illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

CO4: Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

CO5: Ability to develop the strengths and weaknesses of disaster management approaches

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓											
CO2	✓											
CO3	✓	✓										
CO4	✓	✓	✓									
CO5	✓	✓	✓									

REFERENCES

1. Goel S. L., Disaster Administration and Management Text And Case Studies, Deep & Deep Publication Pvt. Ltd., New Delhi,2009.
2. Nishitha Rai, Singh AK, Disaster Management in India: Perspectives, Issues and Strategies, New Royal Book Company, 2007.
3. Sahni, Pardeep et al., Disaster Mitigation Experiences and Reflections, Prentice Hall Of India, New Delhi, 2001.

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AX5093   **SANSKRIT FOR TECHNICAL KNOWLEDGE**   **L T P C**
                                                                                        2 0 0 0

OBJECTIVES
- Illustrate the basic Sanskrit language.
- Recognize Sanskrit, the scientific language in the world.
- Appraise learning of Sanskrit to improve brain functioning.
- Relate Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power.
- Extract huge knowledge from ancient literature.

UNIT I   ALPHABETS   6
Alphabets in Sanskrit

UNIT II   TENSES AND SENTENCES   6
Past/Present/Future Tense -- Simple sentences

UNIT III   ORDER AND ROOTS   6
Order - Introduction of roots

UNIT IV   SANSKRIT LITERATURE   6
Technical information about Sanskrit literature

UNIT V   TECHNICAL CONCEPTS OF ENGINEERING   6
Technical concepts of Engineering - Electrical, Mechanical, Architecture, Mathematics

TOTAL: 30 PERIODS

OUTCOMES
- CO1 - Understanding basic Sanskrit language.
- CO2 - Write sentences.
- CO3 - Know the order and roots of Sanskrit.
- CO4 - Know about technical information about Sanskrit literature.
- CO5 - Understand the technical concepts of Engineering.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										✓		✓
CO2										✓		✓
CO3												✓
CO4												✓
CO5												✓

REFERENCES
1. "Abhyaspustakam" – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi
2. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication.
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean Books (P) Ltd., New Delhi, 2017.

AX5094   **VALUE EDUCATION**   **L T P C**
                                                                                            2 0 0 0

OBJECTIVES
Students will be able to
- Understand value of education and self-development
- Imbibe good values in students
- Letthe should know about the importance of character

UNIT I   SELF DEVELOPMENT
Values and self-development – Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non-moral valuation. Standards and principles. Value judgments.

UNIT II   CULTIVATION OF VALUES
Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline.

UNIT III   BEHAVIOUR DEVELOPMENT
Personality and Behaviour Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature.

UNIT IV   CHARACTER AND COMPETENCE
Character and Competence – Holy books vs Blind Faith. Self-Management and Good Health. Science of reincarnation. equality, nonviolence, humility, role of women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively.

TOTAL: 30 PERIODS

OUTCOMES
Students will be able to
- Knowledge of self-development.
- Learn the importance of human values.
- Developing the overall personality.

SUGGESTED READING
1. Chakroborty, S.K. Values and Ethics for Organizations Theory and Practice, Oxford University Press, New Delhi

AX5095	CONSTITUTION OF INDIA	L T P C
		2 0 0 0

OBJECTIVES
Students will be able to:
- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional
- Role and entitlement to civil and economic rights as well as the emergence nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I   HISTORY OF MAKING OF THE INDIAN CONSTITUTION
History, Drafting Committee, (Composition & Working)

UNIT II   PHILOSOPHY OF THE INDIAN CONSTITUTION:
Preamble, Salient Features

UNIT III   CONTOURS OF CONSTITUTIONAL RIGHTS AND DUTIES

Fundamental rights, right to equality, right to freedom, right against exploitation, right to freedom of religion, cultural and educational rights, right to constitutional remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT IV   ORGANS OF GOVERNANCE

Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

UNIT V   LOCAL ADMINISTRATION

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO, Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

UNIT VI   ELECTION COMMISSION

Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners - Institute and Bodies for the welfare of SC/ST/OBC and women.

TOTAL: 30 PERIODS

OUTCOMES

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

SUGGESTED READING

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S.N. Busi, Dr. B.R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M.P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

AX5096   **PEDAGOGY STUDIES**   **L T P C**
                                                                      2 0 0 0

OBJECTIVES

Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy
- Making under taken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

UNIT I   METHODOLOGY

Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education - Conceptual framework, Research questions - Overview of methodology and Searching.

UNIT II   THEMATIC OVERVIEW

Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.

UNIT III   EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES

Methodology for the in depth stage: quality assessment of included studies - How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? - Theory of change - Strength and nature of the body of evidence for effective pedagogical practices - Pedagogic theory and pedagogical approaches - Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT IV   PROFESSIONAL DEVELOPMENT

Professional development: alignment with classroom practices and follow up support - Peer support - Support from the head teacher and the community - Curriculum and assessment - Barriers to learning: limited resources and large class sizes

UNIT V   RESEARCH GAPS AND FUTURE DIRECTIONS

Research design – Contexts – Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.

TOTAL: 30 PERIODS

OUTCOMES

Students will be able to understand:
- What pedagogical practices are being used by teachers' informal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

SUGGESTED READING

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan Primary Schools, Compare, 31(2):245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36(3):361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1.London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33(3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign. www.pratham.org/images/resource%20working%20paper%202.pdf.

AX5097   **STRESS MANAGEMENT BY YOGA**   **L T P C**
                                                                2 0 0 0

OBJECTIVES
- To achieve overall health of body and mind
- To overcome stress

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UNIT I   YOGA
Definitions of Eight parts of yoga.(Ashtanga)

UNIT II   DOS AND DON'TS
Yam and Niyam - Dos and Don't's in life - i) Ahinsa, satya, astheya, bramhacharya and aparigraha, ii) Ahinsa, satya, astheya, bramhacharya and aparigraha.

UNIT III   PRANAYAM
Asanand Pranayam - Various yoga poses and their benefits for mind & body - Regularization of breathing techniques and its effects -Types of pranayam.

TOTAL: 30 PERIODS

OUTCOMES
Students will be able to:
- Develop healthy mind in a healthy body thus improving social health also.
- Improve efficiency

SUGGESTE DREADING
1. 'Yogic Asanas for Group Training - Part-I Janardan Swami Yogabhyasi Mandal, Nagpur
2. Raja yoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.

AX5098	PERSONALITY DEVELOPMENT THROUGH	L T P C
	LIFE ENLIGHTENMENT SKILLS	2 0 0 0

OBJECTIVES
- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

UNIT I   HOLISTIC DEVELOPMENT
Neetisatakam - holistic development of personality - Verses- 19,20,21,22 (wisdom) - Verses- 29, 31, 32 (pride & heroism) – Verses- 26,28,63,65 (virtue) - Verses- 52, 53, 59 (don'ts) - Verses- 71,73,75,78 (dos)

UNIT II   DUTIES
Approach to day to day work and duties - Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47,48 - Chapter 3-Verses 13, 21, 27, 35 Chapter 6-Verses 5,13,17,23, 35 - Chapter 18-Verses 45, 46, 48.

UNIT III   BASIC KNOWLEDGE
Statements of basic knowledge - Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 Chapter 12 -Verses 13, 14, 15, 16,17, 18 -Personality of role model - Shrimad Bhagwad Geeta - Chapter2-Verses 17, Chapter 3-Verses 36,37,42 -Chapter 4-Verses 18, 38,39 Chapter18 – Verses 37,38,63

TOTAL: 30 PERIODS

OUTCOMES
Students will be able to
- Study of Shrimad - Bhagwad -Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students.

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SUGGESTED READING

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