DDU – KAUSHAL Kendra
Bharathidasan University
Khajamalai Campus, Tiruchirappalli-23
B.Voc., Degree in Immersive Technology – Structure of the Syllabus
(With effect from the academic year 2021 – 2022)

B.Voc., RULES AND REGULATIONS

INTRODUCTION

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocational (B.Voc.) Degree with multiple exits such as Diploma/Advanced Diploma under the NSQF (National skill Qualifications framework).

The B.Voc. programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles along with broad based general education.

This would enable the graduates completing B.Voc. to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

THE MAIN OBJECTIVES OF THE SCHEME ARE:

- To provide judicious mix of skills relating to a profession and appropriate content of General Education & Skill Component.
- To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industrial requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- To provide vertical mobility to students coming out of 10+2 with vocational subjects.

ELIGIBILITY FOR ADMISSION

A pass in Plus Two or equivalent examination or an examination recognized as equivalent thereto by this University.

A pass in 10+2 years in ITI (Two Years) in relevant trade role.

Those who passed Vocational Higher Secondary course will get an additional weightage.

LATERAL ENTRY:

Candidate seeking admission directly in Second year of Bachelor of Vocational –Immersive Technology must have passed Examination of Diploma in relevant trade roles.

MEDIUM OF INSTRUCTIONS

Medium of instruction shall be English.

PROGRAMME STRUCTURE

The B.Voc. Immersive Technology shall include:

- General Education
- Skill Component

CURRICULUM

The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components with 40:60.

DURATION

The duration of the B. Voc. in Immersive Technology shall be three years consisting of six semesters. There shall be at least 90 working days in each semester.

CREDIT SUMMARY

The following formula is used for conversion of time into credit hours.

• One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/labs and tutorials;

Years	**Skill Component Credits**	**General Education Credits**	**Normal calendar duration**	**Exit Points / Awards**
Year 3	36	24	Six Semester	B.Voc
Year 2	36	24	Four Semester	Advanced Diploma
Year 1	36	24	Two Semester	Diploma
Total	**108**	**72**		

As per the UGC guidelines, there are multiple exit points for a candidate admitted in this course. If he/she is completing all the six credits successfully, he/she will get B. Voc. Degree in Automobile Technology. If he/she is completing the first four semesters successfully, he/she will get an Advanced Diploma in Immersive Technology. If he/she is completing the first two semesters successfully, he/she will get a Diploma in Automobile Technology. B.Voc. in Immersive Technology.

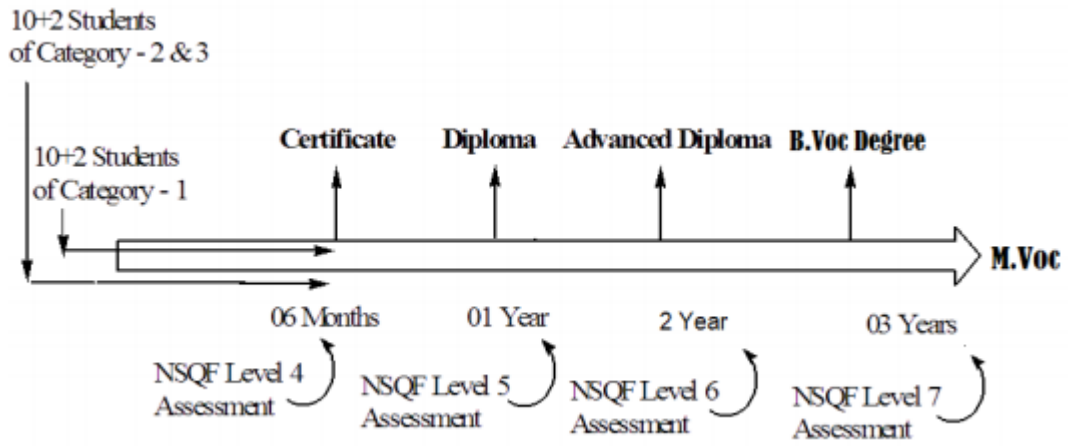

Fig. 1: Assessment of Skill Component under NSQF in Vocational Courses

Question Paper Pattern

Section A : 10 Questions x 2 Marks = 20 Marks
(Two questions from each unit)

Section B : 5 Questions x 5 Marks = 25 Marks
(Internal Choice and one set of questions from each unit)

Section C : 3 Questions x 10 Marks = 30 Marks
(Answer any three out of 5 questions and one question from each unit)

EVALUATION

The performance of a student in each Course is evaluated in terms of percentage of marks with a provision for conversion to grade points. Evaluation for each Course shall be done by a continuous internal assessment (CIA) by the Course teacher concerned as well as by an end semester examination and will be consolidated at the end of the semester. The components for continuous internal assessment are:

Theory		**Practical**	
Best 2 tests out of 3	- 15 Marks	Continuous performance	- 20 Marks
Group Activity/Quiz	- 5 Marks	Model Practical	- 10 Marks
Assignments	- 5 Marks	Record	- 5 Marks
	----------	Viva	- 5 Marks
Total	- 25 Marks		----------
	----------	Total	- 40 Marks

Attendance need not be taken as a component for continuous assessment, although the students should secure a minimum of 75% attendance in each semester. In addition to continuous evaluation component, the end semester examination, which will be a written-type examination of at least 3 hours duration, would also form an integral component of the evaluation. The ratio of marks allotted to continuous internal assessment and to end semester examination is 25:75. The evaluation

of laboratory component, wherever applicable, will also be based on continuous internal assessment and on an end-semester practical examination with 40:60 ratio.

PASSING MINIMUM

Passing Minimum		
Continuous Internal Assessment (CIA)		**University Examination (UE)**
Theory	40% out of 25 marks (i.e. 10 marks)	40% out of 75 marks (i.e. 30 marks)
Practical	40% out of 40 marks (i.e. 16 marks)	40% out of 60 marks (i.e. 24 marks)

Classification of Final Results

(i) For each of the three parts, there shall be separate classification on the basis of the CGPA as indicated in Table - 2.

(ii) (ii) For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/Commerce/Management/Literature as Outstanding/ Excellent/ Very Good/ Good/ Above Average/ Average, the marks and the corresponding CGPA earned by the candidate in Part III alone will be the criterion, provided he / she has secured the prescribed passing minimum in the LCs and the ELCs.

(iii)(iii)Grade in Part IV and Part V shall be shown separately and it shall not be taken into account for classification.

(iv)(iv)Absence from an examination shall not be taken as an attempt.

Table 1 Grading of the Courses

Marks Range	**Grade Point**	**Corresponding Grade**
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
40 and above but below 50	5	C

Below 40	0	R.A.

Table 2 Final Result

CGPA	Corresponding Grade	Classification of Final Results
9.00 and above	O	Outstanding
8.00 and above but below 8.99	A+	Excellent
7.00 and above but below 7.99	A	Very Good
6.00 and above but below 6.99	B+	Good
5.00 and above but below 5.99	B	Above Average
4.00 and above but below 4.99	C	Average
Below 4.00	R.A.	Re-Appearance

Credit based weighted Mark System is adopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).

Total number of credits to be earned for award of the degree = 180 (as per UGC B.Voc Guidelines)

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(w.e.f the academic year 2021-22)

Course Code	Course Type	General Component	Skill Component	L	T	P	C	Marks		Total
								Int.	Extn.	
Semester - I										
21 IMT 101	Course I	Value Education		2	0	0	2	25	75	100
21 IMT 102	Course II	Business Communication		3	0	0	3	25	75	100
21 IMT 103	Course III	Multimedia Elements		3	0	0	3	25	75	100
21 IMT 104	Course IV		Art Design and Visual Aesthetics	4	0	0	4	25	75	100
21 IMT 105	Course V		Digital Illustration Lab	0	0	6	6	40	60	100
21 IMT 106	Course VI		Digital Design Lab	0	0	6	6	40	60	100
21 IMT 107	Course VII		Internship / Industrial Training	0	0	6	6	40	60	100
Total				**30**			**30**	**-**	**-**	**700**
Semester – II										
21 IMT 201	Course VIII	Environmental Studies		3	0	0	3	25	75	100
21 IMT 202	Course IX	Computer Graphics		3	0	0	3	25	75	100
21 IMT 203	Course X		Preproduction for XR	3	0	0	3	25	75	100
21 IMT 204	Course XI		Introduction to UX & UI	3	0	0	3	25	75	100
21 IMT 205	Course XII		2D Animation Design Lab	0	0	6	6	40	60	100
21 IMT 206	Course XIII		UI & UX Lab	0	0	6	6	40	60	100
21 IMT 207	Course XIV		Internship / Industrial Training	0	0	6	6	40	60	100

Total				**30**			**30**	**-**	**-**	**700**
Semester – III										
21 IMT 301	Course XV	Programming Fundamentals		3	0	0	3	25	75	100
21 IMT 302	Course XVI	3D Modelling and Texturing		3	0	0	3	25	75	100
21 IMT 303	Course XVII	3D Rigging and Animation		3	0	0	3	25	75	100
21 IMT 304	Course XVIII		Game Engine	3	0	0	3	25	75	100
21 IMT 305	Course XIX		3D Asset Creation I Lab	0	0	6	6	40	60	100
21 IMT 306	Course XX		Level Design Lab	0	0	6	6	40	60	100
21 IMT 307	Course XXI		Real Time Animation Technique's Lab	0	0	6	6	40	60	100
Total				**30**			**30**	**-**	**-**	700
Semester – IV										
21 IMT 401	Course XXII	Digital Marketing		3	0	0	3	25	75	100
21 IMT 402	Course XXIII	Introduction to Programming– C#		3	0	0	3	25	75	100
21 IMT 403	Course XXIV		Game Design	3	0	0	3	25	75	100
21 IMT 404	Course XXV		Introduction to XR development	3	0	0	3	25	75	100
21 IMT 405	Course XXVI		Advanced 3D Modelling Technique Lab	0	0	6	6	40	60	100
21 IMT 406	Course XXVII		Game Design Lab	0	0	6	6	40	60	100
21 IMT 407	Course XXVIII		Internship / Industrial Training	0	0	6	6	40	60	100
Total				**30**			**30**	**-**	**-**	700

Semester – V										
21 IMT 501	Course XXIX	Softs Skill Development		3	0	0	3	25	75	100
21 IMT 502	Course XXX	Elective I: Sound Design		3	0	0	3	25	75	100
21 IMT 503	Course XXXI	Video Production Techniques		3	0	0	3	25	75	100
21 IMT 504	Course XXXII		XR Development Techniques	3	0	0	3	25	75	100
21 IMT 505	Course XXXIII		AR Application Development Lab	0	0	6	6	40	60	100
21 IMT 506	Course XXXIV		VR Application Development Lab	0	0	6	6	40	60	100
21 IMT 507	Course XXXV		Optimization Lab	0	0	6	6	40	60	100
Total				**30**			**30**	-	-	700
Semester – VI										
21 IMT 601	Course XXXVI	Gender Studies		1	0	0	1	25	75	100
21 IMT 602	Course XXXVII	Entrepreneurship Development		3	0	0	3	25	75	100
21 IMT 603	Course XXXVIII		Elective I: Project Management	4	0	0	4	25	75	100
21 IMT 604	Course XXXIX		Visual Scripting	4	0	0	4	25	75	100
21 IMT 605	Course XXXX		360^{o} Video Production Lab	0	0	6	6	40	60	100
21 IMT 606	Course XXXXI		Final Project	0	0	12	12	40	60	100
Total				**30**			**30**	-	-	600

B.Voc., Immersive Technology– Structure of the Syllabus

(w.e.f the academic year 2021-22)

Semester – V

ELECTIVE COURSES

Core Course Code	Category	Subject Order	Name of the Subject	L	T	P	C	Marks		
								CIA	ESE	Total
	EC01	III	Sound Design	3	0	0	3	25	75	100
		III	Python Programming	3	0	0	3	25	75	100
		III	Problem Solving Techniques	3	0	0	3	25	75	100
		III	Data Structures	3	0	0	3	25	75	100

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(w.e.f the academic year 2021-22)

Semester – VI

ELECTIVE COURSES

Core Course Code	Category	Subject Order	Name of the Subject	L	T	P	C	Marks		
								CIA	ESE	Total
	SEC01	III	Project Management	3	0	0	3	25	75	100
		III	Artificial Intelligence	3	0	0	3	25	75	100
		III	Audio design for XR	3	0	0	3	25	75	100
		III	Data Structure for real time	3	0	0	3	25	75	100

SEMESTER – I
VALUE EDUCATION

Semester I	L T P C
21 IMT 101	2 0 0 2

Objective:
To impart the knowledge of values and systems and to make the students ethically work and practice in the facets of their work contributing to the nation building process.

Learning Outcomes:
Values are socially accepted norms to evaluate objects, persons, and situations that form that form part parcel of sociality.

- It contributes in forming true human being, who are able to face life and make it meaningful. As such, values reflect a person's sense of right and wrong or what "ought" to be.
- There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behaviour and help to solve common human problems.

Unit I Philosophy of Life and Social Values
Human Life on Earth (Kural 629) Purpose of Life (Kural 46) Meaning and Philosophy of Life (Kural 131, 226) Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

Unit II Human Rights and Organisations
Definitions, Nature of Human Rights. Universal Declaration of Human Rights, International covenent on Civil and Political Rights - International covenent of Economic, Social and Cultural Rights. Amnesty International Red Cross.

Unit III Human Rights : Contemporary Challenges
Child labour - Womens Right - Bonded labour - Problems of refugees - Capital punishment. National and State Human Rights Commissions

Unit IV Yoga and Health
Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

Unit V Role of State Public Service Commission
Constitutional provisions and formation - Powers and Functions - Methods of recruitment - Rules and notification, syllabi for different exams - written and oral - placement.

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

References:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004 Leah Levin, Human Rights, NBT, 1998
2. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
3. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Minisry of Health, New Delhi

BUSINESS COMMUNICATION

Semester – III L T P C
18IMT 102 3 0 0 3

Objective:
To enable participants to communicate clearly and with impact, by improving their verbal and non-verbal communication style, as well as enhancing interpersonal skills.

Learning Outcomes:

- ✓ Apply communication strategies and principles to prepare effective communication for domestic and international business situations.
- ✓ Capable of effectively monitoring, analyzing, and adjusting their own communication behavior.
- ✓ Demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation.

Unit 1
Communication: Concept, definition and purpose; Need and importance of communication.

Unit 2
Types, Principles and models of communication: Communication process: Channels and stages of communication: Skills and techniques of communication, Communication media and its role; Role of language in communication.

Unit 3
Communication with self concept of self growth – goals of interpersonal communication, Interviews, Non – verbal communication in small groups.

Unit 4
Mass communication for social change and social action; Types of mass media, selection of suitable approaches and media for different target groups.

Unit 5
Written communication – Types, guidelines in developing different types of written communication.

References:

- Dahama, O.P., Communication for education, New Delhi,
- JCH. BerloDavid.K: the process of communication. An Introduction to theory and practice, New York, Holt Rirepart and Winston Inc.
- NaliniVittal : Communication for Rural Development in India: some facts, Hyderabad HIRD
- Schramwillur : Mass communication Urban. (A university of illness press)
- Tunitall. J (ED): Media Sociology : Reader London constable.
- Developing Communication Skills, Krishna Mohan MeeraBanerji, Birla Institute of Technology and Science, Pilani, 1990.

MULTIMEDIA ELEMENTS

Semester I	L T P C
21 IMT 103	3 0 0 3

Course Objective: Multimedia elements combine more than one type of medium, typically in digital form, such as on computers, audio players, tablets, smartphones, and other technology.

Course Outcomes - This course enables the students:

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

UNIT I - Introduction to Design

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

UNIT II - History of Animation

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

UNIT III - Human Computer Interaction

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

UNIT IV - Elements of Design

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

UNIT V - History of Typography

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

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary Developments Related to the Course during the Semester Concerned.

Reference Books:

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

ART, DESIGN AND VISUAL AESTHETICS

Semester I	L	T	P	C
21 IMT 104	4	0	0	4

Course Objective: Art and design stimulates creativity and imagination. It provides visual, tactile and sensory experiences and a special way of understanding and responding to the world.

Course Outcomes - This course enables the students:

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

Unit I: Introduction to Drawing:

Principle-contrast-difference between elements and design-Unity-Rhythm-proportion-Emphasis

Unit II : Strokes and Shades:

Types of strokes-line and shapes-Texture-Form-different type of line shading-blending-lighting proportion-pencil shades types-measure the drawing-materials-fundamentals shades of light and form-progressively softer grade pencil-negative positive shades-Optical illustration-negative and positive (Illustration).

Unit III : Colours pattern:

Principle-important-meaning-psychological impact-applying method-mixing color ratio-primary and secondary colors-Tertiary colors-complimentary-triadic-split complimentary-Analogous-Monochromatic-Warm and cold-color temperature (Illustration)

Unit IV: Drawing perspective and its proportion:

Principle-perspective -type-proportion-Linear perspective (Illustration)-Types of perspective-Line- Design- Shape- Space- Form- Vanishing points. (Illustration)

Unit V: Character Design:

Principle-Linea-shapes-form-Proportion-Portrait (Illustration)-Character modeling-Different materials components add in (Illustration).

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

Reference:

1. Famous Pablo Picasso Quote “ Art is a Life that makes us realize the truth”

2. Davinci “Art is the queen of all sciences communicating knowledge to all generations of the world”
3. Aristotle “The art of renaissance”

DIGITAL ILLUSTRATION LAB

Semester I	L	T	P	C
21 IMT 105	0	0	6	6

Course Objective: Digital illustration is the creation of a narrative image that tells a story, conveys an emotion or mood, or sells a concept or product. While traditional illustrations are created using methods digital illustrations.

Course Outcomes - This course enables the students:

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

Implement the following in Digital Illustration:

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

DIGITAL DESIGN LAB

Semester I	L	T	P	C
21 IMT 106	0	0	6	6

Course Objective : Digital design ensures we have useful experiences in the online world. It can be especially important for business owners who need aesthetically pleasing designs

Course Outcomes - This course enables the students:

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

Implement the following in Digital Design:

1. Create posters using principles like Positive & Negative space, Emphasis, Repetition and contrast

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

INTERNSHIP / INDUSTRIAL TRAINING

Semester I	L T P C
21 IMT 107	0 0 6 6

Learning Objective:

- Learn the various pipeline available and used in Industrial Training in XR Content development industry.
- Understand integration of business processes across organizations, from user services to the final customer delivery.
- The program provides exposure for the students to use their core knowledge related to a wide variety of Industries in the XR industry
- Learn Industry trends and develop soft skills in the industry by interacting with professionals and supporting them in their tasks

Outcomes On completion of the Training, students will be able to:

1. Understand the fundamentals expectation of the industry as related to XR development.
2. To apply various techniques studied in the course to contribute to the task at company for exploring various departments.
3. Analyse and build skills to meet industry expectations and be able to converse with manager and manage expectations.

SEMESTER – II

ENVIRONMENTAL STUDIES

Semester II	L T P C
21 IMT 201	3 0 0 3

Objective:

- This subject mainly aims to equip the student about the Environmental issues and prepares the students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective.

Learning Outcomes:

On completion of the course, students should be able to:

- To understand the core concepts and methods from ecological and physical sciences and their application in environmental problem-solving.
- To appreciate key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- To appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

Unit: 1

The Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness

Unit: 2

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit: 3 Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids

- Introduction, types, characteristic features, structure and function of the following ecosystem:-
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

Unit: 4 Biodiversity and its conservation

- Introduction – Definition : Genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit: 5 Environmental Pollution

Definition Causes, effects and control measures of :

a. Air Pollution b. Water Pollution c. Soil Pollution d. Marine Pollution e. Noise pollution f. Thermal Pollution g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns. Case studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

Unit: 7 Human Populations and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education
- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

Unit: 8 Field Work

Visit to a local area to document environmental assets-river / forest/ grassland/ hill / mountain

Unit: 9: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security.Stockholm Env.Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment.Cambridge University Press 1140 p.

COMPUTER GRAPHICS

Semester II	L T P C
21 IMT 202	3 0 0 3

Course Objective: It provides the necessary theoretical background and demonstrates the application of computer science to graphics.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Understand the graphics hardware
- Get knowledge about Raster Graphics for drawing 2_D primitives
- Understand 3D Transformations
- Gain knowledge about different types of curves
- Understand Multimedia components.

UNIT – I

GRAPHICS HARDWARE: Basic of Computer Graphics, display technology, Raster Scan & Random scan display systems, Input devices.

UNIT – II

BASIC RASTER GRAPHICS FOR DRAWING 2_D PRIMITIVES: Scan converting lines, circles, ellipse; filling rectangles, polygons, generating characters; antialiasing. Matrix representation and Homogeneous coordinates, two dimensional transformations, 2D line clipping, polygon clipping algorithms, window to viewport transformation.

UNIT – III

VIEWING IN 3D: Three dimensional transformation, projections: Parallel, prospective, viewpoints.

UNIT – IV

INTRODUCTION TO MULTIMEDIA: Multimedia components; multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations. Graphics animation : Tweeking, Morphing simulating accelerator, motion specification.

UNIT – V

Audio and video compression: Text compression, Image compression, Various methods of audio compressions and video compressions

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

REFERENCES:

1. Foley, Van Dam, Fundamentals of Interactive Computer Graphics, Addison Wesly
2. Hearn and Baker Computer Graphics, Prentice Hall of India
3. Rogers D.F. Procedural Elements of Computer Graphics, McGraw Hill

PREPRODUCTION FOR XR

	L	T	P	C
Semester II				
21 IMT 203	3	0	0	3

Course Objective: Preproduction comes early in the process, after development and before production..

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Discuss storytelling techniques for XR development
- Identify the importance of XR flow design
- Understand the scripting requirements for XR development
- Explain the importance of a storyboard

- Capture XR design specifications for development.

Unit 1:
Conceptualization, Introduction, Ideas, Creativity, Research and Analysis on existing XR, Brainstorming – Best practices Alternate methods- Editing and Refining, XR concept – Mission statement – Setting- mechanics- Story synopsis- Concept Art – Audio elements- Guideline for the XR concept, Turning ideas into a XR focus on the formal elements, 180-degree thinking, XR structure, elements of XRplay , Goals, Structure of the XR concept document, Creating a rough sketch, Prototyping, XR Flow Design –state machine.

Unit 2:
Story telling Techniques, XR stories – Structure of XR Stories - XR Play - Research - Period - Historic / Scientific facts, The elements of effective storytelling, XR Characters – development – archetypes-conflict –plot patterns- back-story, Dialogue, exposition, premise, psychological, Props, Food etc.

Unit 3:
Level Analysis, XR structure. Progress structure, Structuring the Story, Titles or Opening Credits, and Superimpose or Title -Title Page -Production Drafts, Nonlinear XR Narrative, Top Continued and Bottom Continued - Locking Script Pages and Locking Scenes -Header, Do's and Don'ts - Other Script Formats, Reading Scripts from Popular XR, Multiplayer online XR, Sample XR script

Unit 4:
Storyboarding, What is Storyboard, Usage, Importance of Story Board, Functions, Terminology, difference between storyboard and Graphic Comic, Difference between Storyboard and Presentation Board. Advantages of Storyboard in Animation, Illustration, Anatomy, rendering your drawings, Techniques and styles, Inking – Graphic styles, Text – as image, Projecting figures in Deep space, Framing and Composition, Perspective and Camera],

Unit 5:
Anatomy of a Storyboard, Lighting and Depth, Poses and Staging, Dos and Don'ts, Thumbnail Storyboard, Preparing Storyboards using Digital software. XR design Document, Technical Document.

Unit 6:
CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Book :

1. Gameplay and design Paperback – by Mr Kevin Oxland (Author)- Addison Wesley (20 May 2004)
2. Beginning Illustration and Storyboarding for Games (Premier Press Game Development) - by Les Pardew (Author) - Cengage Learning PTR; 1 edition (October 8, 2004)
3. Fundamentals of Game Design, -by Adams (Author) - Pearson Education India; 3 edition (2015)

INTRODUCTION TO UX & UI

Semester II L T P C
21 IMT 204 3 0 0 3

Course Objective: Improve customer satisfaction and loyalty through the utility, ease of use, and pleasure provided in the interaction with a product.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Apply principles behind HCI (Human Computer Interaction)
- List User Experience Design (UXD) techniques
- Capture User requirements
- Create navigation structure, layout in UI Design
- Build an application design

Unit I :
Introduction to HCI:
Human-Computer Interaction Foundations, Models & Theories, Programming interactive systems,

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

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

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

Unit V: Case Studies:
Explore case studies, Effective UI Design examples, UX Design examples, Common Errors, Conclusion.

UNIT VI:
CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Text Books:

1. Lean UX: Designing Great Products with Agile Teams - by Jeff Gothelf (Author), Josh Seiden (Author); Shroff/O'Reilly; Second edition (1 November 2016)- ISBN-10: 9352134567,ISBN-13: 978-9352134564.
2. Fundamentals of User-Centered Design: A Practical Approach Paperback – 20 Dec 2016 - by Brian Still (Author), CRC Press; 1 edition (20 December 2016) - ISBN-10: 1498764363,ISBN-13: 978-1498764360.

3. The Essential Guide to user Interface Design: An Introduction to GUI Design Principles and Techniques, - by Wilbert O.Galitz (Author) - Wiley; Second edition (2002) - ISBN-10: 8126502800,ISBN-13: 978-8126502806.
4. Human-computer Interaction- by Alan Dix and Janet Finlay (Author) – Pearson Education (2004) - ISBN-10: 9788131717035.

2D ANIMATION DESIGN LAB

Semester II	L	T	P	C
21 IMT 205	0	0	6	6

Course Objective: Improve customer satisfaction and loyalty through the utility, ease of use, and pleasure provided in the interaction with a product.

COURSE OUTCOMES: On completion of this course, the students will be able to:

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

Implement the following in 2D Animation:

1. Simple rollover animation
2. Button state animation
3. Banner animation
4. Particle Animation
5. Ball bouncing across the screen
6. Character jumping
7. Walk cycle
8. Run cycle
9. Character thinking
10. Change a character emotion (Happy to sad, sad to angry etc.,)

Reference Books:

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

UI & UX LAB

Semester II	L T P C
21 IMT 206	0 0 6 6

Course Objective : Improve customer satisfaction and loyalty through the utility, ease of use, and pleasure provided in the interaction with a product.

Course Outcomes - This course enables the students:

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

Implement the following in UI & UX:

1. Design a UI for a XR Education App
2. Design a UI for a female centric
3. Design a UI suitable for both mobile and PC
4. Design a UI for a horror themed website
5. Design a one pager UI for a website
6. Design a one pager UI for a mobile
7. Design a mascot for an imaginary brand
8. Design a UI compatible

Reference Books:

1. Diana MacDonald, "Practical UI Patterns for Design Systems: Fast- Track Interaction Design for a Seamless User Experience", Apress, 2019.
2. Jenifer Tidwell, "Designing Interfaces: Patterns for Effective Interaction Design" Second Edition, O'Reilly Media, Inc., 2010.
3. R. Moore "UI design with Adobe Illustrator", Berkely, California: Adobe Press, 2013.
4. Lesa Snider, "Photoshop CS6: The Missing Manual", 2nd Edition,O'Reilly Media Publisher, 2012

Internship / Industrial Training

Semester II	L T P C
21 IMT 207	0 0 6 6

Learning Objective:

- Learn the various pipeline available and used in Industrial Training in XR Content development industry.
- Understand integration of business processes across organizations, from user services to the final customer delivery.
- The program provides exposure for the students to use their core knowledge related to a wide variety of Industries in the XR industry
- Learn Industry trends and develop soft skills in the industry by interacting with professionals and supporting them in their tasks

Outcomes On completion of the Training, students will be able to:

1. Understand the fundamentals expectation of the industry as related to XR development.
2. To apply various techniques studied in the course to contribute to the task at company for exploring various departments.
3. Analyse and build skills to meet industry expectations and be able to converse with manager and manage expectations.

SEMESTER - III

PROGRAMMING FUNDAMENTALS

Semester III	L T P C
21 IMT 301	3 0 0 3

Course Objective Programming is about writing the instructions which a computer follows to enable it to store knowledge, process knowledge, and communicate knowledge with the outside world. Stemming from storing knowledge we can move into data structures and databases.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Explain workflow techniques in C
- List data types, operators and expression, statements in C programming.
- Describe arrays and functions
- Explain purpose of pointers and structure.
- Explain graphics and time in C programming

Unit I : Overview of Programming:

Computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement, Programming environment – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters

Unit II: Fundamentals of C Programming:

Explore C programming, Data Types, Constants & Variables, Operators & Expressions, Type casting, Control Statements, looping statements.

Unit III: Arrays and Functions:
Arrays-single & multidimensional arrays, Functions- fundamentals – general form, function arguments, Return values, Searching and Sorting.

Unit IV: Pointers and Structures:
Pointers- The & and * operator, Pointer expression, Assignments, Structures- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers.

Unit V: Graphics.h & time.h:
graphics.h file, important graphic functions, graphic drivers, shapes, lines, circle, rectangle, colors, bar graph, time.h file, variable and function in time.

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Text Books:

1. Programming in C Paperback – by Reema Thareja (Author) - OUP India; 2 edition (25 February 2016) - ISBN-10: 9780199456147,ISBN-13: 978-0199456147
2. Computer-based Problem Solving Process Hardcover - by Teodor Rus (Author) - World Scientific Publishing Co Pte Ltd (18 May 2015) - ISBN-10: 9814663735, ISBN-13: 978-9814663731.
3. Understanding Algorithms and Flowcharts: step by step explanations of simple and complex algorithms with implementation in C (Fundamentals of Modern Information Technology Book 1) Kindle Edition - by Luciano Manelli (Author) - Luciano Manelli; 2 edition (19 August 2015) - ASIN: B0146OD2F0.

3D MODELLING AND TEXTURING

Semester III	L T P C
21 IMT 302	3 0 0 3

Course Objective: The overall goal is to match the surface of the model to its concept art or real-world equivalent.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Understanding the 3D software using polygons by Combining, separating, splitting and Sculpting surface meshes.
- Understanding and to create In-organic modeling.
- Understanding the material and textures with Advanced Modeling.

- Detail knowledge about Hyper shade, UV mapping and Image Based mapping.
- Detail knowledge about background Texturing and Mental Ray Shades.

UNIT I INTRODUCTION TO SET MODELING FOR FILM, GAMING AND TELEVISION.

Set Modeling Overview and Objective: Modeling using Nurbs and Polygons in 3D software. Strategies of Modeling, Tips and Techniques of Modeling usingPolygons.overview of Polygon selection and creation, Combining, separating and splitting. Editing polygons with Sculpting surface meshes, Coloring polygons with Blind data. AppendicesPolygons menus using Polygons windows and editors with Polygons nodes.

UNIT II INTRODUCTION TO IN – ORGANIC, AUTOMOTIVE MODELING

In-organic Modeling such as Solar systems, mountain, stage show background, gaming background. Automotive like car, bus and van with reference pictures. To create a model as it is in the picture.

UNIT III BASIC TEXTURING:

Advanced Materials Using Specialized Material Types. Unwrapping UVs and Using Pelt Mapping and Creating Baked Textures and Normal Maps. Working with Advanced Modeling and Light Tracing with Radiosity, Using Atmospheric and Render Effects .Retracing and mental ray effects with Batch and Network Rendering.

UNIT IV

TEXTURING THE MODEL USING UV MAPPING:

Texturing and Shading, Intro to Hyper shade,UV mapping overview, Mapping UVs, Modeling and Texturing effects,UVs menu reference, UVs windows and editors reference, UVs tool reference, Nodes and Materials, General Utilities, Image Based mapping, Editing UVs, UV sets, UV unwrapping overview, UV by Photoshop and Corel – Coloring

UNIT V RENDERING THE TEXTURE WITH SHADING:

Texturing and Shading by Unwrapping the Models. Gaming background Texturing, Digital texturing using Photoshop and Texturing via other 2D tools.Applying Mental Ray Shades to the model and Using Final Gather to Fine Tuning Mental Ray Shades.

UNIT VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

TEXT BOOKS:

1. Kelly L. Murdock , “Kelly L. Murdock's Autodesk 3ds Max 2015 Complete Reference Guide”- Perfect Paperback ,2014.
2. Kelly L. Murdock, “Autodesk Maya Basics Guide 2015”, 2014.
3. William Vaughan, “Digital Modeling”-,First Edition.2004
4. Allan Britto, “Blender 3.0: The beginner's guide”, 2022,

3D RIGGING AND ANIMATION

Semester III	L T P C
21 IMT 303	3 0 0 3

Course Objective: 3D rigging helps in forming an invisible bone structure that defines how the movement will take place in animation

COURSE OUTCOMES: On completion of this course, the students will be able to:

- 3D rigging is the process of creating an 'invisible' bone structure that defines how an object moves
- 3D rigging helps in forming an invisible bone structure that defines how the movement will take place in animation
- 3D animation is a graphic technique that utilizes motion in order to bring characters, objects, props, and more to life
- 3D animation gives learners the ability to experience real world application of their knowledge and learn from errors without consequence.

Unit – 1 Introduction to Rigging. Understanding Character Movements and Kinematics. Types Of Rigging. Predicting the Needs of a Character Rig based on Story Necessity. Planning Joint Arrangement for Pure FK, IK, Spline IK, Dynamic Musculature, and other Specialized Character Needs. Rigging In 3D Animation.

Unit - 2 Principles of Animation: Squash and Stretch, Anticipation, Staging, Straight Ahead and Pose to Pose, Follow Through and Overlapping Action, Slow In And Slow Out, Arc, Secondary Action, Timing, Exaggeration, Solid Drawing, Appeal. Posing In Animation.

Unit - 3 Nonlinear Animation: Introduction to Nonlinear Animation and Understanding Trax editor and Creating Poses and working with Poses - Creating Clips and working with Clips and Modifying Clips ñ Blending clips

Unit - 4 Line of Action. Application of I, C and S curve in animation. Static and Dynamic poses. Blocking in animation. Application of key pose.

Unit – 5 Extreme, Breakdowns and in-betweens. Application of timing in animation. Application of gestures in animation. Expressions in animation. Lip sync.

Unit - 6: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Books:

1. Dariush Derakhshani, Introducing Maya 2017, Sybex, 2016.
2. Richard Williams, Animation Survival Kit, Revised edition, 2009.
3. Allan Britto, “Blender 3.0: The beginner's guide”, 2022,

GAME ENGINE

Semester III	L T P C
21 IMT 304	3 0 0 3

Course Objective: Arsenal of visual development tools for a developer to help them in the production process

COURSE OUTCOMES: On completion of this course, the students will be able to:

- Game engine is to provide an arsenal of visual development tools
- Game engine for a developer to help them in the production process.
- To develop creativity and individuality in problem solving and performing tasks
- Development program or environment used originally to develop video games

Unit -1 :Overview of Platform:

Introduction to unity2d, Downloading and installing, Project Wizard - Component, Game object, creating a scene, setting up a new project – Project Structure – Folder Organisation – File Naming Conventions, Unity Interface, Android SDK, player settings, Import, File formats, Sounds, performance, Stats panel, Transform, Camera, Mesh and Geometry, Mono Develop, the profiler.

Unit – 2: Game Resources Overview:

Creating Raster & Vector design, Vector Illustration, Modular Design, File formats, importing – Assets – Packages - Game Objects - Components, working in 2D – behaviours – Workspace, Building Sprites – Sprite Packaging - Main Character - Sprites, Environment – Design-Sprites, Enemy –Design- Sprites, Props –Design- Sprites, Sprite editor, Using External Files, sprite render, Props Design - Sprites, Conclusion.

Unit – 3: Game World:

Level design 101, Level editor, scene, Manipulating Objects, Layered sorting,First Level, prefabs, Coding, Player – controller – camera – physics - colliders, Animation – rules – creating animation – States – State machine, Camera Setup, Game hierarchy, Asset Management.

Unit – 4: Visualization for 2D games:

Physics - 2D vs 3D - 2D Settings , Rigid Bodies, Colliders, Gameplay – trigger – checkpoints – collectibles – Player Stats, Scoring Setup, Challenging Gameplay – Enemy – controller – game object – collision – animation, Damage, Expanding on plat forming, scrolling Backgrounds, Prototyping, Pathfinding.

Unit – 5: Game Finalizing Techniques:

UI Design, GUI, HUD, Particle System, Audio System, Organisation and Optimization, Touch controls, Building and deploying, UGUI.

Unit –6: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Books:

1. Game Engine Architecture - Jason Gregory (Author) 2018
2. Introduction To Video Game Engine Development Learn To Design Implement And Use A Cross-Platform 2D Game Engine by Brusca, Springer
3. 3D Game Engine Design (English, Hardcover, Eberly David)

3D ASSET CREATION I LAB

Semester III — L T P C
21 IMT 305 — 0 0 6 6

Course Objective: Explore the physical aspects of a design without surrendering to physical limitations

COURSE OUTCOMES: On completion of this course, the students will be able to:

- 3D modelling provides a level of design depth that rough sketches or 2D designs
- Design process improves understanding of a project,
- 3D modelling aids in the reduction of design time

Implement the following in 3D Asset Creating:

1. Modeling & Texturing a Gun
2. Modeling & texturing a vehicle's (Low-Poly)
3. Modeling & texturing a weapon
4. Modeling & Texturing a furniture
5. Modeling & Texturing a Air force Helicopter / War Machine
6. Modeling & Texturing a Castle and Environment
7. Modeling & Texturing a interior scene
8. Modeling & Texturing an Game environment or showroom environment

LEVEL DESIGN LAB

Semester III — L T P C
21 IMT 306 — 0 0 6 6

Course Objective: introduction to the digital design tools that are relevant in an architectural context.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- To make model, texture, and render professional-looking architectural imagery.
- Learn how to master the intricate user interfaces of Architectural Imagery Software Tools.

- To learn Techniques and working methods related to visual 3D modelling, visualization and animation, etc.

Implement the following in Architectural Software Tool:

1. Create interior and exterior shells of a simple apartment for light bleed test.
2. Model a two storey exterior building with fine details with textures.
3. Model a kitchen cabinet with textures
4. Model a modern style dining table set and texture it.
5. Create a modern style bed with bedsheet and texture it.
6. Create any five decorative models for the apartment with textures.
7. Create a modern style kitchen and texture it.
8. Create a round interior stair case and texture it.
9. Model a modern bathroom and populate it with the objects and texture it.
10. Create a living room and populate it with the objects and texture it.

REAL TIME ANIMATION TECHNIQUE'S LAB

Semester III L T P C
21 IMT 307 0 0 6 6

Course Objective: introduction to the digital design tools that are relevant in an architectural context.

COURSE OUTCOMES: On completion of this course, the students will be able to:

- To make model, texture, and render professional-looking architectural imagery.
- Learn how to master the intricate user interfaces of Architectural Imagery Software Tools.
- To learn Techniques and working methods related to visual 3D modelling, visualization and animation, etc.

Objectives :

Real-Time Performance Capture," is the process of using a motion capture system to render a 3D character alive and in real-time

Implement the following in Real time Animation :

1. Walk cycle
2. Run Cycle Jump
3. Weight lifting
4. Push the box
5. Four leg Animation
6. Wing Animation
7. Stair Case Conversation
8. Breaking animation
9. Import animations in engines
10. Trigger Animation states

SEMESTER – IV

DIGITAL MARKETING

Semester IV	L T P C
21 IMT 401	3 0 0 3

This course enables the students:

- Analyze the role that digital marketing plays in the digital landscape and marketing mix.
- Understand the differences between, and the convergence of, paid, earned, and owned media.
- Identify and incorporate individual social and mobile platforms into a digital marketing strategy.

Unit – I

Introduction to digital marketing - History of digital marketing – Ineffective forms of digital marketing - Digital marketing strategy template - An overview of customer value journey - Move prospects through the customer value journey - Content marketing - Common problems that content marketing can solve - Components of content marketing - Return of investment (roi) of a successful content marketing program - Planning, implementing, and optimizing your content marketing program - Methods of content marketing

Unit – II

Digital advertising - Digital advertising vs traditional advertising - Digital advertising metrics - Digital advertising bidding models - Digital advertising cost - Creating a digital advertising strategy - Future of digital advertising - Social media & History of social media marketing - Importance of social media marketing - Smo (social media optimization) strategy for business - Do keyword research - Optimize your content - Brand awareness - Social engagement - Viral marketing

Unit – III

Email marketing - The importance of email marketing - Growing the email list - Search marketing - Search engine optimization (seo) - Paid search marketing (ppc)

Unit – IV

Web analytics - Web analytic tools - Review web metrics - Importance of web analytics - Conversion rate optimization (cro) - Conversion rate optimization - Calculations of conversion rate - Benefits of conversion rate optimization (cro)

Unit – V

Introduction to app marketing and app store optimization - Key metrics for app store optimization (aso) - Mechanics of aso - Keyword optimization - Introduction 56 to keyword optimization & finding root keywords and long tail keywords - Choosing a keyword - Best performing keywords with search & chance scores - ASO for app store - Increasing the visibility in the apple app store - Increasing conversions in the apple app store - Getting featured in the apple app store - ASO for google playstore - Increase the visibility in oogle play store - Getting featured in the google play store - Apple search ads - Apple search ads basic vs advanced

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Books:

1. Digital Marketing 2021- Michael Branding
2. Understanding Digital Marketing A Complete Guide to Engaging Customers and Implementing Successful Digital Campaigns 2020 Edition by Damian Ryan
3. Digital Marketing For Dummies - Ryan Deiss 2020

INTRODUCTION TO PROGRAMMING – C#

Semester IV L T P C
21 IMT 402 3 0 0 3

This course enables the students:

Unit I: Basics of C#: Basic datatypes, declaring variables and constants Type Conversion, Boxing and Unboxing, Structure String, Manipulation, String Builder, Decision making statements, Switch Case.
Unit II: Object Oriented Programming in C#:Creating Class, declaring variable and methods, Access Modifiers, Constructors, Abstract Class, Partial, Class, Inheritance, method, overloading, method overriding, Anonymous method, Properties, Indexers, Exception Handling
Unit III: Control statements, if, if-else, switch-case, looping statements, while, do-while, for, nested loops, break, continue, array definition, array declaration, for each loop, multi-dimensional arrays, Classes and objects, class declaration, object creation, constructors and destructors
Unit IV: Introduction, Windows, Windows Controls, Graphics class, Color, Pen, Brush, Point, lines, shapes, images
Unit V: Delegates, Multicasting Delegates, Events, Using events in delegates, Dictionary, List, Threads, Object Pooling, Singleton Class.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Reference Books:

1. Nick Samoylov, "Introduction to Programming", 2018
2. Arvind Kumar Bansal, "Introduction to Programming Languages", 2013
3. Bruce Mills , "Theoretical Introduction to Programming", 2005
4. John Guttag, "Introduction to Computation and Programming", 2016
5.

GAME DESIGN

Semester IV L T P C
21 IMT 403 3 0 0 3

Course Objective:

Identify the resources for game design, learn techniques for setting up a game , understand the game mechanism, understand game optimization techniques

Unit-1:

Create a sprite animation for 2D games, Import and integrate sprites in unity.

Unit-2:

Create 10 different sprites animation for the given game, Create different types of character including sprite animation as per the game concept.

Unit-3:

Create environment & props with animation as per the levels requirement (min 5 Levels), Setting up game scenes in unity 2D platform

Unit-4:

Hard body collisions of 2d objects in unity, Create Layer sorting (foreground, midground, background, default) for the given game

Unit-5:

Integrate components (physics / GUI / UI /Sound etc) in game engine, Player Settings and

Publishing for game platforms (PC / Android)

Unit -6 :

CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Book:

1. Learning 2D Game Development with Unity: A Hands-On Guide to Game Creation – by Matthew Johnson (Author), James A. Henley (Author) - Addison-Wesley Professional; 1 edition (December 24, 2014)
2. Learning Unity 2D Game Development by Example - by Venita Pereira (Author) - Packt Publishing (August 25, 2014) - ASIN: B00N1X68Z4.
3. Unity Game Development Blueprints Kindle Edition - by John P. Doran (Author) - Packt Publishing (November 11, 2014)

INTRODUCTION TO XR DEVELOPMENT

Semester IV	L T P C
21 IMT 404	3 0 0 3

Course objectives:

- To make students know the basic concept and framework of virtual reality.
- To teach students the principles and multidisciplinary features of virtual reality.
- To teach students the technology for multimodal user interaction and perception in VR, in
- particular the visual, audial and haptic interface and behavior.
- To teach students the technology for managing large scale VR environment in real time.
- To provide students with an introduction to the VR system framework and development tools.

Unit I: Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality: Multiple Modals of Input and Output Interface in Virtual Reality: Input -Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output - Visual /

Unit II: Auditory / Haptic Devices: Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of Large Scale

Unit III: Environments & Real Time Rendering: Environment Modeling in Virtual Reality - Geometric Modeling, Behavior Simulation, Physically Based Simulation. Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp

Unit IV: Introduction of Augmented Reality (AR): System Structure of Augmented Reality. Key Technology in AR. Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.

Unit V: Application of VR in Digital Entertainment (4 hours): VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester Concerned.

Reference Books:

1. Mobeen Tahir, Mark Ghattas, Dawit Birhanu, Syed Natif Nawaz, “Cisco IOS XR Fundamentals”, 2009
2. Wiley, “Emerging Extended Reality Technologies for Industry 4.0”, 2020
3. Carmine Elvezio, “XR Development with the Relay and Responder Pattern”, 2021

ADVANCED 3D MODELLING TECHNIQUE LAB

Semester IV L T P C

21 IMT 405 0 0 6 6

This course enables the students:

- Advanced modeling, surfacing, and animation techniques; as well as other advanced 3D automation procedures.
- Building on the theories and techniques introduced in the beginning 3D animation course, this course delves deeper into the production.
- Provides a foundation for advanced animation construction, animation and character control, photorealistic and stylistic shading.

Implement the following in Modelling Software Tool:

1. Model a human hand. Starting with a polygon cube primitive and use only polygon extrude, split polygon, delete edge, and manually manipulating component points.
2. Design and prepare a character design. Create a project folder, set up the scene and scale, and begin modeling. Main shapes of entire character should be blocked in.
3. Add details to the Character using multiple techniques including NURBS. At least five
4. (5) detail structures should use NURBS geometry.
5. Finish and clean up the geometry of the character for group critique in class. Objects should be named cleanly in preparation for the next phases of the project.
6. Unwrap the UV's of the Giant Robot, and assigning custom materials to each object. Create UV snapshots of each unwrapped object.
7. Texture the Character. You may use any image editing tools (Photoshop, etc.) and techniques to create textures. Apply the textures to the Character, and manage surface effects such as specularity, bump, and reflection mapping.
8. Acquire a scene for the Character to exist in. This could be an image to act as a background plate or a 3D environment. This will determine the cinematic look for the piece. Setup Mental Ray and add lighting to achieve the desired mood for the piece.
9. Finish the piece. Render image sequences as multiple output passes (Color, reflection, ambient occlusion) and composite them together in post.
10. 3D Character Review and opinion among the students.

Clean up any remaining problems with the Character model. Organize the separate modeling elements. Based on the performance needs of the character, build a character skeleton and begin setting up the character. Save the file.

GAME ENGINE LAB

Semester IV L T P C

21 IMT 406 0 0 6 6

This course enables the students:

- Students will be able understand Unity Engine and its uses
- Ensures that they can implement Design Principles
- Ensures that the student understand Unity Production Pipeline
- Ensures that the students understand Unity

Asset pipeline Implement the following in the Game Design Software:

1. Create a 3D Level with the following setups implemented.
2. Skyboxes

3. Terrains with detailing with rocks, trees, grass, fog, water surface.
4. Object meshes with colliders
5. Lights and Shadows.
6. Create a 3D Level setups implemented:
7. Compile the Scripts and bake the navigation mesh for setting up playable area.
8. Create a 2d platform as per given brief.
9. Create a 3d side scroller for the 3D Level Design.

Create an Environmental Open world scene - Medieval.

INDUSTRIAL TRAINING / INTERNSHIP

Semester IV	L T P C
21 IMT 407	0 0 6 6

Learning Objective:

- Learn the various pipeline available and used in Industrial Training in XR Content development industry.
- Understand integration of business processes across organizations, from user services to the final customer delivery.
- The program provides exposure for the students to use their core knowledge related to a wide variety of Industries in the XR industry
- Learn Industry trends and develop soft skills in the industry by interacting with professionals and supporting them in their tasks

Outcomes On completion of the Training, students will be able to:

- Understand the fundamentals expectation of the industry as related to XR development.
- To apply various techniques studied in the course to contribute to the task at company for exploring various departments.
- Analyse and build skills to meet industry expectations and be able to converse with manager and manage expectations.

SEMESTER - V

SOFT SKILLS DEVELOPMENT

Semester V	L T P C
21 IMT 501	3 0 0 3

Objective:
The course mainly focuses on the Soft Skills (a vital portion of an individual's personality) is an intangible idea in which the qualities like attitude, ability, integrity, reliability, positivity, flexibility, dependability, punctuality, management, cooperation, habits and practices are combined proficiently to capitalize on a person's work efficacy.

Course outcomes:
On completion of the course, students should be able to:

- To help the students understand interpersonal skills.
- To support them in building interpersonal skills.
- To better the ability to work with others.
- After studying this subject, the students can also get the following spirit:Teamwork, Problem-solving, Communication, Analytical ability, Strong work ethic

UNIT I Personal Skills
Knowing oneself- confidence building- defining strengths- thinking creatively- personal values- time and stress management.

UNIT II Social Skills
Appropriate and contextual use of language- non-verbal communication- interpersonal skills- problem solving.

UNIT III Personality Development
Personal grooming and business etiquettes, corporate etiquette, social etiquette and telephone etiquette, role play and body language.

UNIT IV Presentation skills
Group discussion- mock Group Discussion using video recording - public speaking.
Unit III: Presentation Skills: Soft skills for academic presentations - effective communication skills – structuring the presentation - choosing appropriate medium – flip charts – OHP – Power Point presentation – clarity and brevity - interaction and persuasion.

*Compulsory activity: PowerPoint presentations to be conducted by each student in class

Activities: a) Formatting personal and business letters. b) Organising the details in a sequential order c) Converting a biographical note into a sequenced resume or vice-versa d) Ordering and sub-dividing the contents while making notes. e) Writing notices for circulation/ boards. Compulsory activity: Each student should create a blog and/or profile in LinkedIn.

UNIT V Professional skills
Organisational skills- team work- business and technical correspondence- job oriented skills- professional etiquettes.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Books for Reference:

1. Matila Treece: Successful communication: Allyun and Bacon Pubharkat.
2. Jon Lisa Interatid skills in Tourist Travel Industry Longman Group Ltd.
3. Robert T. Reilly – Effective communication in tourist travel Industry Dilnas Publication.
4. Boves. Thill Business Communication Today Mcycans Hills Publication

SOUND DESIGN

Semester V L T P C
21 IMT 502 3 0 0 3

Course Objective: Students should:

1. Understand the basic elements that make up and shuffle the sounds.
2. Learn the basic and essential techniques to work with sound files.
3. Understand how to set up a sound file and Sound track pipeline.
4. Gain hands-on experience in field sound recording, Foley, ADR, sounds effect gathering, scoring, digital audio editing and mixing.

Unit-I : Introduction to Sound forge pro – -Workspace, Main Window, Docking and Floating Window, Data Window,Toolbars, Metadata Windows, ACID properties Window, Extracting Audio from CD, Working with Projects, Editing Audio, Navigating, Selecting, And Zooming,

Unit II: Changing File Property and Format, Editing Multichannel Audio, Using Markers, Regions, Commands, Recording. Editing, Repairing, Synthesizing Audio. Use of Event Tool. Pre-processing Audio. Working With Effects. Use of Acoustic Mirror And Wave, working with video.

Unit-III : Introduction of Audacity - Digital audio fundamentals, Workspace, Viewing, zooming, and navigating audio Customizing and saving application settings, Extracting audio from CDs, Recording audio, Editing audio files, Displaying audio in the Waveform Editor, Copying, cutting, pasting, and deleting audio, Working with markers, Inverting, reversing, and silencing audio,

Unit-IV: Applying effects - Effects controls, applying effects in the Multitrack Editor, Effects reference, Multitrack Editor overview, Basic multitrack controls, Arranging and editing multitrack clips, Clip volume matching, fading, and mixing, Video and surround sound, Importing video and working with video clips, surround sound, Saving and exporting files.

Unit V: Audio in Game engines – XR BG Music – XR Mono Spatial Audio – XR audio reverbs – folleys – audio mixers – audio engine – audio triggers – audio functions

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Reference Books:

1. Audio Engineering Tip's Audio Engineering - Narrated by Donald Reed

2. Sound Design For Moving Image by Kahra Scott-James
3. Sound Design, Mixing and Mastering with Ableton Live 9 – Jake perrina

VIDEO PRODUCTION TECHNIQUES

Semester V	L T P C
21 IMT 503	3 0 0 3

Objectives:

Video content gives you a fantastic way to structure, plan, and nurture leads' progression in your marketing funnel. However, not every video's the same! Different styles have specific traits that make them more (or less) effective at accomplishing different marketing goals.

Unit I: Basics of editing, Pal Video for windows, Pal quick time multimedia QuickTime, Using Project Window, Video Settings, Audio Settings, Compressor, Depth, Frame Size, Frame Rate, importing still images, Using the monitor window, Viewing safe zones, use of editing and full knowledge about video editing. Audio fundamentals (Audio quality, formats and devices), Audio fundamentals

Unit II: quality, formats and devices), Creating transitions, Transition Settings, Image Mask Transition, applying transitions, viewing transitions.

Unit III: Film and Digital photography (technology, techniques, composition & lighting etc.), Making movie, finalizing sound and effects, rendering.
Unit IV: Production Techniques - The Media Industry: Structure and Strategies, Audio-Video program production (Concept to Mastering), Compositing and Audio-Video Editing.

Unit V : Ownership of Media, Media as Business & Media Economics, Income resources, Government Policies for Media Ownership.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Reference Books:

1. Michael K. Hughes, “Digital Filmmaking for Beginners A Practical Guide to Video Production”, 2012
2. Leonard Shyles, “The Art of Video Production”, 2007
3. James C Foust, Edward J Fink, Lynne S Gross, “Video Production Disciplines and Techniques”, 2017
4. Donald L. Diefenbach, Anne E. Slatton, “Video Production Techniques”, 2019

XR DEVELOPMENT TECHNIQUES

Semester V	L T P C
21 IMT 504	3 0 0 3

Course objectives:

- To make students know the basic concept and framework of virtual reality.

- To teach students the principles and multidisciplinary features of virtual reality.
- To teach students the technology for multimodal user interaction and perception in VR, in
- particular the visual, audial and haptic interface and behavior.
- To teach students the technology for managing large scale VR environment in real time.
- To provide students with an introduction to the VR system framework and development tools.

Unit I: Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality: Multiple Modals of Input and Output Interface in Virtual Reality: Input -Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output - Visual /
Unit II: Auditory / Haptic Devices: Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of Large Scale
Unit III: Environments & Real Time Rendering: Environment Modeling in Virtual Reality - Geometric Modeling, Behavior Simulation, Physically Based Simulation. Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp
Unit IV: Introduction of Augmented Reality (AR): System Structure of Augmented Reality. Key Technology in AR. Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.
Unit V: Application of VR in Digital Entertainment (4 hours): VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.
Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Reference Books:

1. Mobeen Tahir, Mark Ghattas, Dawit Birhanu, Syed Natif Nawaz, “Cisco IOS XR Fundamentals”, 2009
2. Wiley, “Emerging Extended Reality Technologies for Industry 4.0”, 2020
3. Carmine Elvezio, “XR Development with the Relay and Responder Pattern”, 2021

AR APPLICATION DEVELOPMENT LAB

	L	T	P	C
Semester V				
21 IMT 505	0	0	6	6

Lab Exercises:

1. Setup Vuforia API in game engine
2. AR Marker creation
3. Recognize Image using Vuforia
4. Create the Unity project and place the 3D model on Surface using Vuforia
5. Setup AR Foundation
6. Create a face filter using AR Foundation
7. Create the web-based AR application using AR.js Studio
8. Create a spark AR Filter
9. Publish the spark AR filter
10. Create a simple Augment Reality App build for android.

VR APPLICATION DEVELOPMENT LAB

Semester V	L	T	P	C
21 IMT 506	0	0	6	6

Lab Exercises:

1. Developing architecture of a house using Virtual Reality.
2. Perform CRO based experiment using Virtual Reality.
3. Undertaking qualitative analysis in Chemistry using Virtual Reality.
4. Carry out assembly/disassembly of an engine using Virtual Reality.
5. Explore human anatomy using Virtual Reality.
6. Simulation of circulation of blood in heart.
7. Simulation of Fight or Vehicle or Space Station.
8. Building Electronic circuit using Virtual Reality,given basic electronic components.
9. Developing concept of Virtual class room with multiplayer.

OPTIMIZATION LAB

Semester V	L	T	P	C
21 IMT 507	0	0	6	6

Course Objectives:

- Programming Optimization Standard and Balance.
- Assets and Network Optimization
- Build optimization

Lab Exercises:

1. Memory optimization,
2. performance optimization
3. Art optimization,
4. audio assets optimization,
5. Network optimization
6. Programming optimization with Unity: Scene and Game Object optimization,
7. Creating and using re-usable textures and optimization
8. Converting high poly model to low poly model,
   Asset Bundle Optimization, Texture Compressions in unity.

SEMESTER - VI

GENDER STUDIES

Semester VI	L T P C
21 IMT 601	1 0 0 1

Objectives

- To make boys and girls aware of each others strengths and Weakness.
- To develop sensitivity towards both genders in order to lead an ethically enriched life.
- To promote attitudinal change towards a gender balanced ambience and women empowerment.

Unit I Concepts of Gender

Sex – Gender – Biological Determinism – Patriarchy – Feminism –Gender Discrimination – Gender Division of labour – Gender Stereotyping – Gender Sensitivity – Gender Equity – Equality – Gender Mainstreaming - Empowerment.

Unit II Women's Studies vs Gender Studies

UGC's Guidelines – VII to XI Plans – Gender Studies : Beijing Conference and CEDAW – Exclusiveness and Inclusiveness.

Unit III Areas of Gender Discrimination

Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Policies and Planning .

Unit IV Women Development and Gender Empowerment : Initiatives – International Women's Decade – International Women's Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies .

Unit V Women's Movements and Safeguarding Mechanism

In India National /State Commission for Women(NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd and 74th Amendment for PRIS

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary evelopments Related to the Course during the Semester Concerned.

References

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited ,2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited,2004
3. BhasinKamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited ,1993
4. PernauMargrit, Ahmad Imtiaz, ReifeldHermut (ed.,)Family and Gender : Changing Values in Germany and India ,New Delhi :Sage Publications,2003
5. AgarwalBina, Humphries Jane and Robeyns Ingrid(ed.,) Capabilities , Freedom , and Equality: AmartyaSen's Work from a Gender Perspective,New Delhi : Oxford University Press ,2006

ENTREPRENEURSHIP DEVELOPMENT

Semester VI | L T P C
21 IMT 602 | 3 0 0 3

OBJECTIVES

- The goal of this subject is to provide a space and platform for discovery, both self discovery and opportunity discovery. Students will discover their strengths in terms of an entrepreneurial skill founding team and learn basics such as opportunity discovery, prototyping, competition analysis, and early customer insights and participate in on-line and campus activities and events such as idea competitions, business plan challenges, etc.

LEARNING OUTCOMES

- This course motivates to become an entrepreneur.
- The students also learn to prepare business plan

Unit-I: Introduction to Entrepreneurship Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, Myths about entrepreneurs, agencies in entrepreneurship management and future of entrepreneurship types of entrepreneurs.

Unit-II: The Entrepreneur Why to become entrepreneur, the skills/ traits required to be an entrepreneur, Creative and Design Thinking, the entrepreneurial decision process, skill gap analysis, and role models, mentors and support system, entrepreneurial success stories.

Unit-III: E-Cell Meaning and concept of E-cells, advantages to join E-cell, significance of E-cell, various activities conducted by E-cell

Unit-IV: Communication Importance of communication, barriers and gateways to communication, listening to people, the power of talk, personal selling, risk taking & resilience, negotiation.

Unit-V: Introduction to various form of business organization (sole proprietorship, partnership, corporations, Limited Liability company), mission, vision and strategy formulation.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

REFERENCES:

1. Dr. P.T .Vijayashree& M. Alagamma,2010,Entrepreneurial Development & Small Business Mgmt.MarghamPublications,Tamilnadu,India.
2. Tim Berry,2008,The Plan-as-You-Go Business Plan, Entrepreneur Press;Fitch Irvine, CA

PROJECT MANAGEMENT

Semester VI | L T P C
21 IMT 603 | 4 0 0 4

Course Outcomes:

- List production pipeline requirements
- Describe hard and soft infrastructure requirements
- Plan human resource deployment
- Perform SWOT Analysis for a market opportunity
- Present risk mitigation and remediation strategies

Unit I : **Production Overview:**

Production pipeline – Study of various mediums of production such as Film, T.V, Games, etc.

Unit II: **Pipeline**:
Requirement for a Production Pipeline, process and the pipeline, A typical pipe line – Infrastructure.

Unit III: **Project Management**:
Pipeline Management, Project Management, The work force , The recruitment , Studio Design , India scenario.

Unit IV: **SWOT Analysis** :
Strengths, Weaknesses, Opportunities, and Threats , Market opportunities, Analysis, Competitive Analysis, challenges, Approval.

Unit V: **Risk Analysis** –
Identify risks, Analyze each risk, Prioritize each risk , Risk classification grid, Risk analysis spreadsheet, Risk Assessment, Risk control.

Unit –VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):
Contemporary evelopments Related to the Course during the Semester Concerned.

Text Books:

1. The Game Production Handbook, 3rd Edition - by Heather Maxwell Chandler (Author) - Jones & Bartlett Learning; 3 edition (March 20, 2013) - ISBN-10: 1449688098, ISBN-13: 978-1449688097.
2. Game Development Essentials: Game Project Management - by John Hight (Author), Jeannie Novak (Author) - Cengage Learning; 1 edition (March 27, 2007) - ISBN-10: 1418015415, ISBN-13: 978-1418015411.
3. The Game Producer's Handbook Paperback – Dan Irish (Author) - ISBN-10: 1449688098, ISBN-13: 978-1449688097.
4. SWOT Analysis. Idea, Methodology And A Practical Approach - by Nadine Pahl (Author), Anne Richter (Author) - GRIN Verlag; 1 edition (March 27, 2009) - ASIN: B01M0XIF87

VISUAL SCRIPTING

Semester VI	L T P C
21 IMT 604	4 0 0 4

Course Objective: Visual scripting is a graphical way to manipulate objects and behaviours in Unity without writing code from scratch, built by connecting visual nodes together, empowering artists, designers, and programmers to create gameplay and interactive systems in a simple way.

Course Outcomes - This course enables the students:

- To explain importance of game engine
- To elucidate scripting techniques using C++
- To assess physics parameters required for game development
- To construct particle systems and camera techniques
- To identify about the build process and platforms

Unit -1: Introduction:

Introduction: Unreal Engine Setup, Installing Unreal Engine, Installing Visual Studio, Creating First Project, Understanding Project Structure, Understanding The Game Window Hierarchy, Understanding Unread Editor, Working With Unreal Class System, Create Scenes, Understanding The Blueprint Mechanism, Understanding Predefined Workflow, Terrain, Import Assets, Audio, Sprites, Font, Using Market Place, Import And Use Assets From Asset Store, Working With Multiple Scenes, Using 2D Objects, Working With SFX

Unit -2 Working with C++ :

Understanding C++ Function Syntax, Working With #Include, Namespaces, Working With Enumerations, Creating Header Files, Using Type Alias, Understanding TMap And Map.

Unit -3Game Scene:

Physics And Collider 2D, Working With Line Tracing, Work With Different UI Components, Handling Different Events, Understanding Physics 2D, Using Landscape Layers, Working With Colliders, Using Physics Material, Material, Meshes, Animations And Animator Controller 2D & 3D, Creating Animations, Handling Multiple 2D Character Animation, Creating Text Animation.

Unit -4 :Visualization :

Camera And Particles, Working With Camera Controls, Understanding 3rd Person Camera Control, Working With AI Controls, Working With Particle System, Using Particle System In Game, Working With Particle Bounding Boxes.

Unit -5 :Game Finalizing:

User Interface, HUD, optimizing, Package project– Android / PC/MAC Standalone, Texture compression and debug stripping, Quality Settings, Player Input Settings, Testing, Build a game.

Unit –6: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

Text Books:

1. Visual Studio 2022 In-Depth - 2nd Edition- Ockert J. du Preez
2. Mastering Game Design with Unity 2021- Scott Tykoski
3. Visual Thinking: Empowering People & Organizations Through Visual Collaboration - Willemien Brand

360^{O} VIDEO PRODUCTION LAB

Semester VI	L	T	P	C
21 IMT 605	0	0	6	6

Course Objective: 360 video is to immerse the viewer in the experience as if they were there. 360 video and virtual reality are sometimes used synonymously,

Course Outcomes - This course enables the students:

- To Learn 360-video production planning
- To perform 360-camera functions and operations
- With creating 360-video editing with tools
- To do Media analysis
- For Filmmaking process and considerations

Lab Exercises:

1. working with VR and 360 video
2. Understanding Color balance and its tools
3. Using Color Manipulation Tools
4. Working with Light effects
5. Working with synthetic lens Effects
6. Working with Object Tracking
7. Stitching or slicing video
8. Understanding 360 Projections
9. Deployment of 360 video
10. Working with special Audio

Reference Book:

1. Michael Wohl, The 360° Video Handbook: A step-by-step guide to creating video for virtual reality (VR) 1st Edition, 2017
2. Tony Parisi, Learning Virtual Reality 1st Edition , 2015
3. Stephan Schütze, Anna Irwin-Schütze New Realities in Audio A Practical
4. Guide for VR, AR, MR and 360 Video, 2018

FINAL PROJECT

	L	T	P	C
Semester VI				
21 IMT 606	0	0	12	12

Objective

- To understand the fundamentals of handling projects, applying the various concepts learned in the previous chapters and preparing a solution based on the design breif.
- The main focus of the Project should be on the chosen area of Specialization – Immersive Technology.
- For the consideration of project submission all the steps of the project needs to documented in the project report and submitted as part of the coursework
- To understand the importance of entrepreneurship as a tool for development, the basic principles of entrepreneurship, the concept and basic principles of innovation.

Project evaluation

For Project work, the assessment will be done on a continuous basis as follows:

Review / Exam	Weightage
First Review	10%
Second Review	20%
Third Review	20%
End - semester Exam	50%

The following items are needed to be submitted as art of the coursework

1) Project Work in either working or not working condition
2) Project report covering the following
    a. Project objective
    b. Project Phases – Pre, Production and Post
    c. Test reports
    d. Final observation from Industry
    e. Final observation by self
3) Review report and attendance report