



**Rayat Shikshan Sanstha's**

**Yashwantrao Chavan Institute of Science,**

Satara

**SYLLABUS**

**FOR**

**B.Sc. Animation Science (Entire)**

Choice Based Credit System (CBCS)

**THIRD YEAR SEMESTER V/VI**

**With effect from JUNE 2019**

**Year 2020-21 onwards**

## Syllabus for Bachelor of Science Part III: Animation Science (Entire)

### 1. TITLE: Animation Science (Entire)

2. **YEAR OF IMPLEMENTATION:** Syllabus will be implemented from June, 2018 onwards.

### 3. PREAMBLE:

Animation is a lead Course in today's world. It has very good Prospects and it gives a broad platform to student creativity. The Course has wide scope. By considering the need of different Industries and present scenario in animation industry the syllabus is designed. While designing the syllabus intellectual level of UG Students have been considered. The students who don't know about the Animation will be able to understand and work independently in the Industrial world after completion of his graduate degree.

Animation is not only creation of cartoons but also it plays an important role in Automobile industry, Mechanical industry, Web development, different coding, Vfx, Graphics designing, Film industry and etc. Bachelor of Animation course is one among the most demanded courses in today's world, In the very recent trend India is emerging in the field of "Animation" and this would create a very huge employment in India, there are many big giant companies who are outsourcing their animation work in India like Disney. Animation as a Profession can be the best decision for those who are computer lovers, who can think differently, innovatively and keep the capacity of presenting what they think. While designing the syllabus, industrial training and latest software's like Adobe Photoshop, Corel draw, Adobe Flash, Dream viewer, Autodesk 3D Max, Autodesk 3D Maya, After Effects, Mud box are considered.

This syllabus is based on basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research. The units of the syllabus are well defined, taking into consideration the level and capacity of students.

### 4. GENERAL OBJECTIVES OF THE COURSE:

Computer Animation and Game Development graduates will have an understanding of critical and aesthetic issues in computer graphics and mixed-media.

They will know basic aesthetic principles and concepts, and the production process.

They will be able to effectively use technical, conceptual and critical abilities, and appropriate technology tools.

They will be effective written and oral communicators with the ability to function as effective members of collaborative multi-disciplinary teams in the production process.

They will be able to critically evaluate computer graphics and the mixed media. They will have an appreciation for the professional code of ethics for the creative process.

**5. ELIGIBILITY:**

HSC or std. 12th Science of Maharashtra State Board or any other equivalent with Science

**6. DURATION:**

The course shall be a full time of 3 years duration with 2 semesters per year

**7. EXAMINATION PATTERN:**

Theory – Semester Wise

Practical – Semester Wise

**8 .MEDIUM OF INSTRUCTION:**

The medium of instruction shall be in English

**9. PASSING MARKS FOR B. SC.ANIMATION SCIENCE:**

A minimum of 40% marks in both theory and practical is required for passing

**YASHAVANTRAO CHAVAN INSTITUTE OF SCIENCE ,SATARA**

**COURSE STRUCTURE UNDER AUTONOMY**

**B. Sc. ANIMATION SCIENCE (ENTIRE)**

**B. Sc. III SEMESTER– V (Duration – 6 Months)**

Sr. No.	SUBJECT CODE	PAPER AND TITLE	TEACHING SCHEME						
			Theory			Practical			
			No. of lectures	Hours	Credits	Subject	No. of lectures	Hours	Credits
1	BAST--501	3D Maya - II	3	2.4	2	BASP--507	8	6.4	4
2	BAST--502	V.F.X-II	3	2.4	2				
3	BAST--503	3D Blender -I	3	2.4	2	BASP--508	8	6.4	4
4	BAST--504	A- Market Research B- E-commerce C- UIXD	3	2.4	2				
5	SECC	Artificial Intelligence	3	2.4	2	BASP-SEC-1 Project	8	6.4	4
6	AECC-5	English for communication I							
	<b>Total of SEM IV</b>		<b>15</b>	<b>12</b>	<b>10</b>		<b>24</b>	<b>19.2</b>	<b>12</b>
<b>TOTAL NO OF CREDITS FOR SEMESTER V: 22</b>									

**B. Sc. III SEMESTER– VI (Duration – 6 Months)**

Sr. No.	SUBJECT CODE	PAPER AND TITLE	TEACHING SCHEME						
			Theory			Practical			
			No. of lectures	Hours	Credits	Subject	No. of lectures	Hours	Credits
1	BAST--601	Game design -II	3	2.4	2	BASP--607	8	6.4	4
2	BAST--602	Blender -II	3	2.4	2				
3	BAST--603	3D-Maya -II	3	2.4	2	BASP--608	8	6.4	4
4	BAST--604	A- 3D Printing in Animation B- AR for Animation C - VR for Animation	3	2.4	2				
5	SECC	Entrepreneurs hip Development	3	2.4	2	BASP-SEC-2 Project	8	6.4	4
6	AECC-6	English for communication II							
	<b>Total of SEM IV</b>		<b>15</b>	<b>12</b>	<b>10</b>		<b>24</b>	<b>19.2</b>	<b>12</b>
<b>TOTAL NO OF CREDITS FOR SEMESTER VI: 22</b>									
<b>TOTAL NO OF CREDITS FOR SEMESTER V+ VI: 44</b>									

## EVALUATION STRUCTURE

### B. Sc. III SEMESTER– V (Duration – 6 Months)

Subject	Paper	ESE	Internal Exam		Subject	Practical-I Exam	Submission	
			CEE-I	CCE-II (Online Test)			Case study/ Educational Tour/Seminar/Training/ Scientific writing	Day to day Performance
BAST--501	3D Maya - II	40	5	5	BASP--506 ANIMATION LAB- XV	40	5	5
BAST--502	V.F.X-II	40	5	5				
BAST--503	3D Blender-I	40	5	5	BASP--507 ANIMATION LAB- XVI	50	5	5
BAST--504	A- Market Research B- E-Commerce C- UIXD	40	5	5				
SECC	Artificial Intelligence	20	-	-		30		
AECC 4	English for communication I	40	5	5	BASP- 508 Project ANIMATION LAB- XVII	25	25	
<b>Total of SEM V</b>	TOTAL	160	25	25		125	35	10
	<b>GRAND TOTAL</b>	<b>400</b>						

**B. Sc. III SEMESTER– VI (Duration – 6 Months)**

Subject	Paper	ESE	Internal Exam		Subject	Practical-I Exam	Submission	
			CC E-I	CC E-II (Online Test)			Case study/ Educational Tour/Seminar/ Training/ Scientific writing	Day to day Performance
BAST--601	Game design -II	40	5	5	BASP--605 ANIMATION LAB- XVIII	40	5	5
BAST--602	3D Blender-II	40	5	5				
BAST--603	3D-MAYA-III	40	5	5				
BAST--604	A- 3D Printing in Animation B- AR for Animation C- VR for Animation	40	5	5	BASP--606 ANIMATION LAB- XVIX	50	5	5
Skill Enhancement	Entrepreneurship Development	20	-	-		30		
AECC 4	English for communication II	40	5	5	BASP-607 Project ANIMATION LAB- XX	25	25	
<b>Total of SEM VI</b>	<b>TOTAL</b>	160	25	25		125	35	10
	<b>GRAND TOTAL</b>	<b>400</b>						

**Rayat Shikshan Sanstha's  
Yashavantrao Chavan Institute of Science, Satara (Autonomous)  
Syllabus Introduced from June, 2020**

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**B.Sc. Part III: Animation Science (Entire)**

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**Theory: BAST - 501: 3D Maya - II**

**Learning Objectives:-**

1. The primary objective of this course is to teach students the essentials of working in 3D using an array of features and tools.
2. This course teaches new users the basics of creating, embellishing, and animating 3D scenes.
3. After completing this course, student should be able to: Model objects using a variety of techniques.
4. Design and apply materials, Adjust basic lighting , Animate simple objects Build and animate simple, effective environments.

**Learning Outcomes**

1. Modeling and construction: Construction of the wire frame and kinematic structures for characters/objects to be animated within their environments will be covered. This will include both Polygonal and Nurbs modeling issues.
2. Texturing: Creation of surface information and details for all the created objects are covered in this step. Issues of rendering effects and optimizing for speed will be stressed.
3. Animation: Movement, exaggeration, expression, character animation and timing are addressed at this point.
4. Post Production: This step includes rendering of elements, compositing, editing, layback to audio and getting the final product to its proper media as well as proper compressions (DVD, Internet, Film etc.).
5. This course is a hand-on, production-based class. Upon completion of this course, aside from the general competencies listed above, students should be able to:

Understand and use Maya to create a range of 3D models and animations.

- Focusing on detail and quality.
  - Use Maya's capabilities such as modelling, Texturing and paint effects, lighting.
6. This course introduces students to all the major features of Maya: modeling, texture, lighting, and popular workflow. Concepts are quickly reviewed and explained and then demonstrated using Maya. Students will gain proficiency by following class examples as well as creating projects and exercises.

### **Unit 1: Maya Interface**

**9**

Working in Maya-Creating and Editing Maya Nodes, Creating Maya Projects, Organizing Complex Node Structures with Assets, File References.

Polygon Modeling: Understanding Polygon Geometry, Working with Smooth Polygons, Using Smooth Mesh Polygons, Editing Polygon Components, Adding Components.

### **Unit 2: Modelling**

**9**

Modeling with Deformers, Combining Meshes, Polygon Modeling with Paint Effects.

NURBS Modeling:-Understanding NURBS, Employing Image Planes, Modeling NURBS Surfaces ,Convert NURBS Surfaces to Polygons, Boolean Operations, Sculpting Polygons Using Artisan, Advanced Polygon Editing Tools, Using Subdivision Surfaces.

### **Unit 3 : Texturing**

**9**

UV Texture Layout, What Are UV Texture Coordinates?, Mapping the Giraffe Leg, Unfolding UVs, Mapping the Giraffe Head, Mirroring UVs, More UV Tools, Arranging UV Shells ,Additional UV Mapping Considerations, Transferring UVs, Multiple UV Sets ,Optimizing Textures, Bump and Normal Mapping, Bump Maps, Normal Maps, Creating Normal Maps, Applying Normal Maps, Displacement Mapping, Converting Displacement to Polygons.

### **Unit 4 : Lighting**

**9**

Shadow-Casting Lights, Shadow Preview, Depth Map Shadows, mental ray Shadow Map Overrides, Ray Trace Shadows, and Indirect Lighting: Global Illumination, Global Illumination, Final Gathering Maps, Using Lights with Final Gathering, Image-Based Lighting, Final Gathering.

## **BASP--506: ANIMATION LAB-XV**

### **Group-I**

#### **Experiments:-**

1. Create Various Basic 3D geometrical shapes
2. 2.Polygon :- Selection, Creation, combining, separating, Splitting and Editing
3. Create Basic Polygon inorganic objects (lamp, Mobile, computer, Bike, Car)
4. Create Interior with polygon and Subdivision
5. Create Cartoon and semi cartoon characters with poly
6. Create male and female body with polygon modeling with details
7. Create UV Texture Layout with simple object



8. Applying Texture for inorganic polygon models- I (Lamps, Mobile, Planet, Land with grass texture, rock, atmospheric objects system)
9. Applying Texture for organic polygon models – I (Cartoon, Semi cartoon)
10. Basics of lighting
11. Absorption, reflection and refraction of light
12. Apply and adjust basic direct lighting
13. Position features of a light interactively
14. Mental ray Light Source
15. Shadow in mental ray

### **Theory: BAST - 502: V.F.X-II**

#### **Learning Objective :**

1. The Prime Objective Of using VFX is to give rise to a Scene or images that is very close to resembling reality but may be an impossibility to capture in the camera.
2. The main purpose of subject is that they should be able to work as a Vfx Roto Artist.
3. This course emphasizes developing advanced compositing skills with a focus on various pipeline workflows and shot finishing.
4. Students will practice advanced compositing techniques using plates from actual film projects.
5. Students will also learn stereo compositing techniques and workflows.

#### **Learning Outcomes :-**

1. Demonstrate a comprehensive knowledge of the key software and techniques used in the VFX production pipeline, including their key features and operation.
2. Demonstrate a knowledge and understanding of VFX industry trends.
3. Demonstrate an ability work to deadlines, including the ability to work with client briefs, and as part of a team.
4. Demonstrate their competency with the use of the core VFX Production techniques : Matte painting, Rotoscoping, Motion Capture, Match Moving, and advanced particles and Field effects.
5. Produce a professional quality Showreel identifying their Competency in the core VFX production techniques.

#### **Unit – I**

Introduction, Silhouette feature, Installation and Licensing, Interface of Silhouette, Sequence editor, Roto Node, Motion Blur, Time line, Tracker.

#### **Unit – 2**

Paint Node, Power matte Node, Composite node, Morphing, Z Matte, Depth, ROI ( Region of Interest), All Nodes, Render.

#### **Unit – 3**

Introduction of Mocha pro, Mocha pro Feature, Interface of Mocha pro, Stereo Interface, Using mocha pro plugins, Starting new project, Merging and importing projects, Tracking Basics,

Stereo Tracking, Adjust track, Rotoscoping Basics, Rotoscoping with Magnetic and Freehand tools.

Unit – 4

painting Splines with the area brush tool, Stereo Rotoscoping, Exporting Tracks, Exporting Mattes and clip, The camera Solve Module, the insert module, the mega clean plates in the Remove module, the Remove Module, The stabilize Module, the lens Module, Using Mocha Pro for 360Vr Workflow, The reorient Module, The Dope Sheet And Curve Editor, The Clip tab, Preferences, File format.

### **Reference books:-**

1. Silhouette 5.2 User Guide ( Unit I,II)
2. Silhouette v7.5 User Guide ( Unit I,II,)
3. Mocha pro 2020 User guide ( Unit IV)
4. Digital Visual Effects & Compositing Book .

### **BASP--506: ANIMATION LAB-XV**

#### **Group-I**

#### **Experiments:**

1. Point Track in Silhouette FX Roto.
2. Planer Track in Silhouette FX Roto.
3. Mocha Track in Silhouette FX Roto.
4. Stereo (3d conversion) Rotoscoping in Silhouette FX Roto (Output in Color,Grey,Alpha).
5. VFX( Green Screen Croma) Rotoscoping in Silhouette FX Roto (Output in Color,Grey,Alpha).
6. Clean plate in Silhouette FX Roto.
7. Motion Blur in Rotoscoping in Silhouette FX Roto.
8. Basics of the Remove Module With mocha pro.
9. Tracking and Screen Replacement With Mocha for After effect.
10. Mega plate Module With Mocha pro .
11. Stabilize 360 video with Mocha pro.
12. Build up Complex Composite Using Trees Window in Silhouette Fx Roto.
13. The reorient Module,
14. The Dope Sheet And Curve Editor,
15. The Clip tab, Preferences, File format.

## **Theory: BAST - 503: 3D Blender-I**

### **Learning Objectives:**

1. Quick Switch a helper to quick switch workspaces and view render menu in viewport.
2. Automatically rotating an object (e.g. a sun) to match the brightest point in a HDRI environment texture.
3. Easy HRDI is a free Blender add-on that will help you to load and test your HDRI images quickly.
4. Alternative UI layout for modifiers with handy features. Available also inside the sidebar and as a popup.
5. Quickly assign 20materials to selection using pop-up menu.
6. A Blender 3D add-on to make adding object shake easy and flexible.

### **Learning Outcomes:**

1. Learn about 3D modelling in general and become familiar with the Blender interface.
2. Adventure further into the blender interface. Learn how to model a house and a simple person.
3. Use modifiers to create a hat for your simple person. Learn about materials, textures, and halos.
4. Become familiar with how Blender organizes data. Model multiple objects to learn about modifiers and other tools.
5. Randomize size, color and position to make a virtual world look realistic

### **Unit -I**

User Interface, Workspaces, Interface Control, Buttons and Controls, Extended Controls- Data-Block Menu, List Views & Presets, Color Picker, Color, Ramp Widget, Curve Widget, Operator Search, Nodes, Tools- Tool System, Undo & Redo, Annotate Tool, Selecting.

**Unit -II** Modeling- Meshes- Introduction, Toolbar, Structure, Primitives, Selecting, Editing, Properties, Mesh Analysis, Text , Text Layout, Properties, Empties , Usage, Modifiers - Introduction, Common Modifier

Texture Nodes- Introduction, Materials Setting up Materials, Legacy Textures- Introduction, Types. Lights- Light Objects , Common Settings, Renderer Settings, Types of Lights, World Environment , Surface, Volume.

### **Unit III**

Introduction -Animation, Rigging. Key frames - Introduction, Editing, Keying Sets.

Armatures - Introduction, Bones, Properties, Structure, Skinning, Posing. Lattice - Editing, Properties, Usage. Constraints - Introduction and Interface, Motion Tracking, Transform, Tracking, Relationship.

Actions - Working with Actions, Bake Action. Drivers - Introduction, Usage, Drivers Panel, Workflow & Examples, Troubleshooting. Markers - Types, Visualization, Add Marker.

### **Unit IV:**

**9**

Markers - Selecting, Editing, Bind Camera to Marker. Shape Keys - Introduction, Shape Keys Panel, Workflow. Motion Paths – Options, particles and dynamics, vfx base animation.

## **BASP--507**

### **ANIMATION LAB-XVI**

#### **Group-I**

#### **Experiments:**

1. Blender Tutorial for Beginners: Coffee Cup
2. Blender 2.6 Modelling Tutorial - Making a Dinner Table Fork - Part 2 Filling and Extruding
3. Blender3D - Modelling a Leather Seat
4. Blender Tutorial for Beginners: Cup with Wood Texture
5. Texturing a wooden table in blender
6. Blender Tutorial: Fuzzy Stuffed Bear
7. Blender Tutorial: Photorealistic Ring
8. How to make a Glossy Plastic material in Blender
9. Blender Character Creation: Modelling
10. Create any low poly animal | Blender
11. Blender Simple Studio Lighting
12. Blender - Easy Light Sign in Eevee
13. Blender Tutorial: Copper Wire Text
14. Blender 2.77a Basic Architecture Tutorial
15. Interior Lighting Tutorial

## **BAST-504: A-Market Research**

### **Learning Objectives**

1. Students should understand a general definition of research design.
2. Students should know why educational research is undertaken, and the audiences that profit from research studies.
3. Students should be able to identify the overall process of designing a research study from its inception to its report.
4. Students should be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.
5. Students should know the primary characteristics of quantitative research and qualitative research.
6. Students should be able to identify a research problem stated in a study.
7. Students should be familiar with how to write a good introduction to an educational research study and the components that comprise such an introduction.
8. Students should be familiar with conducting a literature review for a scholarly educational study:
  - a. The steps in the overall process.
  - b. The types of databases often searched.
  - c. The criteria for evaluating the quality of a study.
  - d. The ways of organizing the material found.
  - e. The different types of literature reviews.
9. Students should be able to distinguish a purpose statement, a research question or hypothesis, and a research objective.

### **Learning Outcomes:**

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);
2. To portray accurately the characteristics of a particular individual, situation or a group(studies with this object in view are known as descriptive research studies);
3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies);
4. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).

### **Unit 1:**

**9**

The Backbone for E-Commerce: Early Ages of Internet; Networking Categories; Characteristics of Internet; Components of Internet – Internet Services, Elements of Internet, Uniform Resource Locators, Internet Protocol; Shopping Cart, E-Security: Security on the Internet; Network and

Website Security Risks – Denial-of-Service attacks, Viruses, Unauthorized access to a computer network; Vulnerability of Internet Sites.

## **Unit 2:**

9

Internet Service Provider (ISP); World Wide Web (WWW); Portals – Steps to build homepage, Metadata; Advantages of Portal; Enterprise Information Portal (EIP). Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time factor, Bidding process, Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

## **Unit-3**

9

Definition, Characteristics Research Objectives, Research Design, Research Methodologies, Research Process, Primary and Secondary Data: Classification of Data; Secondary Data: Uses,

Advantages, Disadvantages, Types and sources; Primary Data Collection: Observation method, Focus Group Discussion, Personal Interview method. Types of Research, Research Design: Concept and Importance in Research – Features of a good research design.

## **Unit-4**

9

Introduction to Sampling, Characteristics of a good sample, types of sampling, Formulation of Hypothesis, Characteristics of Hypothesis, Patent, copy rights, Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in animation science and Computer Science, Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

### **REFERENCES :**

1. Research Methodology Practice – P. Philominathan – Shri A.V.V.M. Pushpam College – Poondi –Thanjavur
2. Research Methodology – Methods & Techniques 2 nd, Kothari C. R. – Vishwa Prakashan – New Delhi 1990.
3. An Introduction to Research Procedure in Social Sciences – Gopal M. A. – Asia Publishing House – Bombay
4. Argyris C. “Personality and Organisation: The Conflict Between System and Individuals “Harper and Row, New York, 1995.
5. A Practical Guide to Market Research by Paul Hague

### **Practical:**

1. What is e-commerce and early ages of internet; networking categories.
2. Explain characteristics of internet; components of internet – internet services, elements of internet.
3. E-security: security on the internet; network and website security risks
4. Denial-of-service attacks, viruses, unauthorized access to a computer network; vulnerability of internet sites.
5. Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking.

6. Implementation of e-commerce: www.ebay.com - b2c website – registration, time factor, bidding process,
7. Growth of ebay; paypal – new trend in making payments online; national electronic funds transfer.
8. What is a Research Paper and how to write abstract .
9. Explain Classification of Paper into one or the other Category
10. How to write Proposal of Research Papers with Citation Formats.
11. Write down the Steps for Writing the Research Paper and Why Formatting is Important.
12. Write down the Steps for generating Ideas for Topic of the Research Paper.
13. How to do Bibliographies.
14. Write down the procedure for publishing paper.
15. Publish paper in conference or in journal.

### **Theory: BAST-504: B-E-commerce**

#### **Learning Objectives:**

1. Easy decision thanks to low initial investment
2. Our performance-linked pricing model ensures low and predictable project costs.
3. Enhance your competitiveness by reducing risk
4. We handle all activities associated with distribution to end customers, thereby dramatically reducing your risk exposure.
5. Learn from our experience
6. With our full-service solution, you can leverage Inters hop’s extensive experience across the entire process chain, not just our technical skills

#### **Learning Outcomes:**

1. Demonstrate an understanding of the foundations and importance of E-commerce
2. Demonstrate an understanding of retailing in E-commerce by:
  - a. Analyzing branding and pricing strategies,
  - b. Using and determining the effectiveness of market research
  - c. Assessing the effects of disintermediation.
3. Analyze the impact of E-commerce on business models and strategy
4. Describe the infrastructure for E-commerce
5. Discuss legal issues and privacy in E-Commerce.

#### **Unit 1:**

**9**

The Backbone for E-Commerce: Early Ages of Internet; Networking Categories; Characteristics of Internet; Components of Internet – Internet Services, Elements of Internet, Uniform Resource Locators, Internet Protocol; Shopping Cart, E-Security: Security on the Internet; Network and Website Security Risks – Denial-of-Service attacks, Viruses, Unauthorized access to a computer network; Vulnerability of Internet Sites.

#### **Unit 2:**

**9**

Internet Service Provider (ISP); World Wide Web (WWW); Portals – Steps to build homepage, Metadata; Advantages of Portal; Enterprise Information Portal (EIP). Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time factor, Bidding process, Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

### **Unit 3:**

**9**

Defining Commerce; Main Activities of Electronic Commerce; Benefits of E-Commerce; Broad Goals of Electronic Commerce; Main Components of E-Commerce; Functions of Electronic Commerce – Communication, Process of E-Commerce; Types of E-Commerce; Role of Internet and Web in E-Commerce; Technologies Used; E-Commerce Systems.

### **Unit 4:**

**9**

Various Activities of E-Commerce; Various Modes of Operation Associated with E-Commerce; Matrix of E-Commerce Types; Elements and Resources Impacting E-Commerce and Changes, E-Payment Systems: Electronic Funds Transfer; Digital Token Based E-Payment Systems; Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking.

### **REFERENCES:**

- 1) E – Commerce: Strategy, Technologies and Applications” by David Whiteley
- 2) E-Commerce: An Indian Perspective” by P T Joseph

### **Practical:**

1. What is e-commerce and early ages of internet; networking categories.
2. Explain characteristics of internet; components of internet – internet services, elements of internet.
3. E-security: security on the internet; network and website security risks
4. Denial-of-service attacks, viruses, unauthorized access to a computer network; vulnerability of internet sites.
5. Steps to build homepage, metadata; advantages of portal; enterprise information portal (eip).
6. Implementation of e-commerce: www.ebay.com - b2c website – registration, time factor, bidding process,
7. Growth of ebay; paypal – new trend in making payments online; national electronic funds transfer.
8. Defining ecommerce; main activities of electronic commerce; benefits and goals of e-commerce;
9. Process of e-commerce; types of e-commerce
10. Role of internet and web in e-commerce; technologies used; e-commerce systems.
11. Various activities of e-commerce.
12. Various modes of operation associated with e-commerce
13. Modern Payment Systems with examples.
14. Steps for Electronic Payment with examples.
15. Payment Security and Net Banking with examples.



## **BAST-504: C-UID (User Interface Design)**

### **Learning Objectives:**

1. Understand User Interface.
2. Project Basic Interfaces.
3. Understand Advanced User Interfaces.
4. Testing Interfaces.

### **Learning Outcomes:**

1. Students will learn the all new interfaces. They will learn the very basics all the way to the more advanced interfaces.
2. At the end of the course students will have the skills, knowledge and knowhow to create and use interfaces.
3. Students will walk away with all the skills needed to create their very basic interfaces and advanced interfaces from start to finished!

### **Unit I:**

**9**

The Backbone for E-Commerce: Early Ages of Internet; Networking Categories; Characteristics of Internet; Components of Internet – Internet Services, Elements of Internet, Uniform Resource Locators, Internet Protocol; Shopping Cart, E-Security: Security on the Internet; Network and Website Security Risks – Denial-of-Service attacks, Viruses, Unauthorized access to a computer network; Vulnerability of Internet Sites.

### **Unit II:**

**9**

Internet Service Provider (ISP); World Wide Web (WWW); Portals – Steps to build homepage, Metadata; Advantages of Portal; Enterprise Information Portal (EIP). Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time factor, Bidding process,

Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

**Unit-III: (9)**

Usability interface, usability problem, heuristic evaluation and user review, usability development process, case-study- hotel management system, types of prototypes. Analysis, vision, virtual window design, function design, prototype and defect correlation, Reflection on user design.

**Unit-iv: (9)**

Introduction, system designs, basic steps for system development model, waterfall model, pyramid modeling, study concept- white box testing and black box testing. Introduction, entities, types of entities, entity relationship model, to study on hierarchies and trees, study concept-normalization.

**Reference Books:**

1. User Interface Design by Soren Louesen
2. Software Engineering by Ronald J. Leach

**Practical:**

1. What is e-commerce and early ages of internet; networking categories.
2. Explain characteristics of internet; components of internet – internet services, elements of internet.
3. E-security: security on the internet; network and website security risks
4. Denial-of-service attacks, viruses, unauthorized access to a computer network; vulnerability of internet sites.
5. Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking.
6. Implementation of e-commerce: www.ebay.com - b2c website – registration, time factor, bidding process,
7. Growth of ebay; paypal – new trend in making payments online; national electronic funds transfer.
8. To study the concept of user interface, usability factors and usability problems.
9. To study about user review.
10. To study and implement the usability development process and waterfall model.
11. Case study on hotel management system.
12. To study on data model, task description and data description.
13. To study on entity relationship model.
14. To study on hierarchies and trees.
15. To study about normalization.

## **Skill Enhancement course**

### **Paper Title: SECC-Artificial Intelligence**

#### **Learning objectives:**

1. Explain the basic knowledge representation, problem solving, and learning methods of Artificial Intelligence
2. Assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving particular particular engineering problems.
3. Develop intelligent systems by assembling solutions to concrete computational problems.
4. Understand the role of knowledge representation, problem solving, and learning in intelligent-system engineering

#### **Learning Outcomes:**

1. Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.
2. Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
3. Use classical Artificial Intelligence techniques, such as search algorithms, minimax algorithm, neural networks, tracking, robot localization.
4. Ability to apply Artificial Intelligence techniques for problem solving.

#### **Unit I:**

**What is Artificial Intelligence:** The AI Problems, The underlying Assumption, What is an AI Technique?

#### **Unit II:**

**Problems, Problem Spaces and Search:** Defining the problem, as a state space search, production systems, problem characteristics, production system characteristics, Issues in the design of search programs.

#### **Unit III:**

**Heuristic Search Techniques:** Generate-and-Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction Means-Ends Analysis.

**Unit IV:**

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural deduction. Representing Knowledge Using Rules: Procedural versus Declarative Knowledge, Forward Versus Backward Reasoning, Matching.

**Reference Books:-**

1. Artificial Intelligence: Elaine Rich, Kevin Knight, TMH, 2nd Edition.
2. Artificial Intelligence: Structures and Strategies for Complex Problem solving: George F Luger, 4th Ed., Pearson Education, Asia.
3. Introduction to Artificial Intelligence and Expert Systems: D. W. Patterson, PHI, 2nd Edition.

**Practical**

1. Algorithm to print the given number is even or odd.
2. Algorithm to print the number is prime or not.
3. Algorithm to print factorial of a number.
4. Algorithm to print multiplication of table.
5. Algorithm to print Specified structure using special character.
6. Figure out and explain Applications of AI.
7. Illustrate Importance of AI.
8. Enlist various sectors explore with AI.
9. Which is the best way to go for Game playing problem?
10. Describe the working of traveling salesman problem.
11. Illustrate the working of BFS.
12. Describe the working of DFS.
13. Describe the working of HillClimbing.
14. Illustrate AO\* algorithm.
15. State Use of AI in Animation Science industry.

**B. Sc. Part – III Animation (Entire)**  
**Semester – VI**  
**BAST-601: Game Design -II**

**Learning Objectives:**

1. Create model with basic skills.
2. Instructional Methods
3. The Unity Game Programming curriculum is a -semester course covering topics typically found in Video Game Design or similar courses.

**Learning Outcomes:-**

1. Learning Outcomes With Unity, you can learn the Unity platform and game development fundamentals from the trenches by following the production of a working game from concept all the way through to publishing.
2. Unity gives you a structured, self-study program that includes everything you and your students need to succeed:
3. All Toys game project exercise files and assets you or your students will need to follow along in Unity Focus on the essentials.
4. Learn about the job roles and skills most essential to game production, and gain Unity experience that directly maps to preparation for the Unity in this syllabus.
5. Build a working game.
6. Develop an end-to-end understanding of game production with Unity by building games, a third-person, 3D, survival arcade game.
7. Learn hands-on as you execute game development tasks along with the videos—from importing assets, to scripting behaviour, to building the game for publication

**Unit I: -**

Object-Oriented Concepts - Defining Classes, Creating and Using Classes , Defining Functions , Accessing Game Objects , Constructor and Property Functions.

Managing Game Objects -Prefabs, Creating and Destroying Objects , Activating and Deactivating Objects , Controlling Object Lifespans with Invoke.

Exceptions and Debugging - Run-Time Exceptions , Finding Run-time Errors , Using the Debugger

Loops and Arrays - Arrays , for() and foreach() Loops , while() Loops.

### **Unit II: -**

Virtual Worlds - Moving Cameras , Setting Boundaries , Building a Tile World , Mini-Maps  
Scrolling Games - Wrapping Background , Scrolling Game Mechanics , Parallax Effects

Animation - Simple Unity Animation , Animator States , Scripting Animations , Animations and Colliders.

### **Unit III : -**

Sound Effects - Sound Files , Adding Sounds to Game Objects , Scripting Sounds.

Advanced Game Physics - Applying Forces , Unity Physics Joints , Unity 2D Effectors.

Multiple Scenes • Creating New Scenes -Scripting Scene Changes , Saving Objects Across Scenes  
Mini Artificial Intelligence - Artificial Intelligence Concepts , Flowcharts and Algorithms , Scripting AI  
User Interfaces - Unity Buttons , Other UI Controls , UI Design Concepts.

### **Unit IV: -**

Game Art - Perspectives , Color Theory , Image Editing.

Publishing Games - Splash Screens, Credit Scenes and Icons , Publishing to PC, Mac and Linux Computers , Publishing to Smartphone's , Publishing to Game Consoles.

### **Practical :**

1. Deep Space
2. Deep Space 2
3. Bug Hunt
4. Banana Breakout
5. Loops and Arrays - Arrays , for() and foreach() Loops , while() Loops.
6. Planning Documents
7. Treasure Hunt
8. RoboDash sound with Animation
9. Mini-Golf
10. Space Creeps buttons
11. Publish Your Game
12. Publishing to PC, Mac and Linux Computers .
13. Publishing to Smartphone's .
14. Publishing to Game Consoles.
15. Sound Effects - Sound Files , Adding Sounds to Game Objects , Scripting Sounds.

## **BAST-602: 3D Blender-II**

### **Learning Objectives:**

1. Understand UV's.
2. Project Basic UV's.
3. Understand Advanced Unwrapping.
4. Testing UV's.
5. To provide an overview of a range of effects rendering techniques that adds realism to an image or scene.
6. To study process of creating bitmap images of your scene based on various shading, lighting and camera attributes.
7. Use of rendering in architecture, video games, simulators, movie or TV visual effects.
8. Understanding the nParticle workflow.
9. Draw paint effect strokes.
10. Create and manipulate nCloth objects.

### **Learning Outcomes:**

1. Students will learn the all NEW Blender 2.8 and it's new interface. They Will learn the very basics all the way to the more advanced of creating animations in 3D using Blender 2.8
2. At the end of the course students will have the skills, knowledge and knowhow to create their very own animations from start to finish
3. Students will walk away with all the skills needed to create their very own animations and works of art from start to finished product!
4. Studying about the nParticles, using hardware rendering.

Introduction, EEVEE, Cycles, Workbench, Cameras, Lights, Materials, Shader, Nodes, Color-Management, FreeStyles, Layer & Passes.

**Unit-II:** (9)

Introduction, Output Options, File Formats, Audio Rendering, Metadata, Stereoscopy, Rendering Animations, Animation Player

**Unit-III:** (9)

Introduction, Rigid Body, Cloth Simulation, Soft Body, Particles System, Fluid Simulation, Dynamic Paints, Forces, Collision, Baking Physical Simulation.

**Unit-IV:** (9)

Basic 3D Modelling, Building Basic Models, Textures and Environment, Animation, Game Input, Managing and Viewing Game Data, Creating a Game Design Document.

**Reference Books:**

1. Blender Basic Second Edition by James Chronister.
2. Introduction To Blender 3D by John B Blam.
3. Blender Basic Fourth Edition by James Chronister.

**BASP-606 Animation Lab-XIX**

**Group-I**

1. Render inorganic object.(BOX)
2. Render interior and exterior scene.(Architectural)
3. Rendering environmental scene.
4. EEVEE Blender rendering with basic object.
5. Exporting videos with various format.
6. Sample scene with smoke and Cloth Simulation.
7. Water Simulation with scene.
8. Dynamic Paint. (EEVEE)
9. Simple Game Concept in blender.
10. Create A Dice Game.
11. Basic 3D Modelling, Building Basic Models,
12. Textures and Environment, Animation, Game Input.
13. Managing and Viewing Game Data,
14. Creating a Game Design Document.
15. Stereoscopy, Rendering Animations, Animation Player



### **BAST-603: MAYA-III**

#### **Learning Objectives:**

5. To provide an overview of a range of effects rendering techniques that adds realism to an image or scene.
6. To study process of creating bitmap images of your scene based on various shading, lighting and camera attributes.
7. Use of rendering in architecture, video games, simulators, movie or TV visual effects.
8. Understanding the nParticle workflow.
9. Draw paint effect strokes.
10. Create and manipulate nCloth objects.

#### **Learning Outcomes:**

1. Students can learn about rendering techniques and effects.
2. Learning about shading concepts and mental ray shaders in maya.
3. Studying about the nParticles, using hardware rendering.
4. Students can learn about adding fur, hair and clothes to the objects using dynamics.

#### **Unit-I: Paint Effects, Toon shading**

**(9)**

Using the Paint Effects Canvas, Painting on 3D Objects, Understanding Strokes, Designing Brushes, Create Complexity by Adding Strokes to a Curve, Shaping Strokes with Behavior Controls, Animating Strokes, Rendering Paint Effects, Using Toon Shading.

#### **Unit-II: Lighting with Mental ray and Shading Techniques**

**(9)**

Shadow-Casting Lights, Indirect Lighting: Global Illumination, Indirect Lighting: Global Illumination, Image-Based Lighting, Physical Sun and Sky, Light Shaders, Shading Concepts,

Creating Blurred Reflections and Refractions Using Standard Maya Shaders, Basic mental ray shaders, Car Paint Materials, The MIA Material.

**Unit-III: Rendering for compositing and Introducing nParticles (9)**

Render Layers, Render Passes, Render Pass Contribution Maps, Setting Up a Render with mental ray, Mental ray Quality Settings, Using Fluid Containers, Creating a Reaction, Rendering Fluid Container, Create Fluids and nParticle Interactions.

Creating nParticles, Making nParticles Collide with nCloth Surfaces, Using nParticles to Simulate Liquids, Using Wind, Shading nParticles and Using Hardware Rendering To Create Flame Effects, Rendering Particles with mental ray.

**Unit-IV: Dynamic Effects (9)**

Creating nCloth Objects , Creating nCloth and nParticle Interactions , Rigid Body Dynamics, Creating Smoke Trails, Adding Fur to Characters, Rendering Fur Using mental ray, Adding Hair to a Character, Rendering Hair, Creating Clothing for Characters.

**Reference Books:**

3. Mastering Autodesk Maya 2015, Author-Tood Palmar (Unit III,IV).
4. Mastering Autodesk Maya 2011 by Eric Keller( Unit I,II).

**BASP-605 Animation Lab-XVIII**

**Group-II**

1. Render settings with sun and sky.
2. Rendering paint effects (creating grass in maya by paint effect, shadow effect).
3. Designing brushes (growing flowers, adding leaves).
4. Painting 3D objects using 3D paint tool with environmental scene .
5. Applying paint effects to maya text curves(minimum 3 types).
6. Toon shading (Toon fills and toon outlines)with Character.
7. Render glass in mental ray in maya (exterior scene).
8. Mental ray shader with interior rendering .
9. Fooling around with nParticles.
10. Snow simulation with nParticles.
11. rain simulation with nParticles.
12. Introduction to dynamics-nCloth(flag).
13. Creating fur in maya.Creating hair in maya.
14. Adding Hair to a Character, Rendering Hair,

### **Theory: BAST - 604: A-3D Printing in Animation**

#### **Learning objectives:**

1. Acquaint students with the immediate and powerful impact of motion design.
2. Reinforce basic to advanced graphic design principles in motion graphics.
3. Acquaint students with industry standard software, hardware and accompanying techniques.
4. Provide historical and current perspectives in the area of motion graphics.
5. Introduce students to terminology and concepts in motion graphics.
6. Introduce students to the categories of commercial, broadcast, main title and music video.

#### **Learning Outcomes:**

1. Explain the production and post-production processes
2. Defines post-production vehicles
3. Evaluates table-top animation possibilities
4. Will be able to use After Effects software
5. Evaluates usage areas and methods of After Effects software
6. Defines the basic concepts, tools, and possibilities of After Effects software
7. Will be able to implement 2D animation applications
8. Will be able to prepare storyboard
9. Will be able to animate with different techniques (Frame, Keyframe, Cut-out, Stop-motion, etc.) using After Effects software
10. Will be able to make the animations ready for broadcasting

#### **Unit I**

Introduction of Unity, Unity Project, Unity Projects, Assets, and Scenes, Assets and Project Files,

## Unit II

Materials and Textures, Mesh Renderers, Shaders

Materials for 2D Games, Method 1: Use White Ambient Light

Method 2: Use Light-Immune Shades, Creating Textures

Power-2 Dimensions Retain Quality, Expand Alpha Channels for Transparency

## Unit III

Introduction of Motion graphics, Creating composition, Basic animation, Layer Management,  
Modes, Masks & Mattes, Camera, lights,

## Unit III

Text Animation, Effects and presets, Color keying, Time & Tracking, Working with audio,  
Exporting & rendering.

### Practical :

1. Create props for game design character.
2. Create a Scene in Unity.
3. Animations in Unity.
4. Creating environmental background.
5. Smooth text animation in after effect .
6. Pop up circles animation for intros in after effect.
7. Animating a scene in after effect.
8. Create explainer video Animation in after effects.
9. Portfolio motion graphics in after effects.
10. Creating advertising product animation in after effects.
11. Introduction of Motion graphics,
12. Creating composition,
13. Basic animation with examples.
14. Materials and Textures, Mesh Renderers, Shaders
15. Materials for 2D Games, Method 1: Use White Ambient Light

### Reference Books:

1. Motion Graphic Design: Applied History and Aesthetics. **Author:** Jon Krasner.  
**ISBN:** 9780240809892. **Publisher:** Focal Press.

## **BAST 604 B: AR for Animation**

### **Learning outcomes**

1. Augment reality involve the presentation of artificial stimuli to present what looks like real, physical and tactile elements through the use of multisensory technology.
2. Augmented reality (AR) is a groundbreaking technology which enhances the real world by virtual objects in order to create a new mixed reality environment.

### **Learning objectives**

1. Augmented reality systems consist of an output device displaying the virtual information, a tracking system for determining position and orientation of the user, a computer processing the necessary data and arbitrary input devices for navigation and interaction.
2. One of the key challenges for augmented reality applications is the tracking of the user viewing position and orientation in real-time, in order to obtain precise alignment between real and virtual objects.

### **Unit I**

Introduction of Unity, Unity Project, Unity Projects,  
Assets, and Scenes, Assets and Project Files,  
Navigating Scenes and Viewports, Game Objects, Transforms, and Components  
Cameras, Scripting and the Unity API, Performance, Profiling, and the Stats Panel

### **Unit II**

Materials and Textures, Mesh Renderers, Shaders  
Materials for 2D Games, Method 1: Use White Ambient Light  
Method 2: Use Light-Immune Shades, Creating Textures

### **Unit III**

#### **Introduction to Augmented reality**

Definition and Scope, history of augmented reality, Industry and construction, Medical, television, games

#### **Displays**

Multimodal Displays, visual perception, Spatial Display model, Visual Displays.

#### **Tracking**

Tracking, Calibration, and Registration, Coordinate system, Model transformation, view transformation, projective transformation.

### **Unit IV**

#### **Modeling and annotation**

Specifying geometry , specifying appearance, semi- automatic reconstruction, free- form modeling, annotation.

#### **Mobile Sensors**

Global positioning system, wireless networks, magnetometer, gyroscope.

#### **Optical tracking**

Model based versus model free tracking, illumination, markers versus features, target identification.

#### **Computer vision for augmented reality**

Marker tracking, Multiple, Camera infrared tracking, Natural feature tracking by detection  
Incremental tracking, Simultaneous localization and mapping, Outdoor tracking

#### **Practical:-**

1. Create props for game design character.
2. Create a Scene in Unity.
3. Animations in Unity.
4. Creating environmental background.
5. Alien world in a cylinder target in 3d unity.
6. Creating Augment reality mobile app in 3d unity.
7. Watch Display animation in after effects.
8. 3d camera tracking in after effect.
9. AR Cube with Vuforia in Unity 3D.
10. Marker based AR with vuforia and unity.
11. User defined target (No coding version) AR with vuforia and unity.
12. 3D object tracking with vuforia and unity.
13. Working with multitarget (Cuboid target) AR with unity and vuforia.
14. Virtual button with unity and vuforia.
15. Marker tracking, Multiple, Camera infrared tracking,

#### References:

1. Dieter schmalstieg, Tobias hollerer, “Augmented Reality”.
2. Steve aukstakalnis, “Practical Augmented reality”...
3. Jon peddle, “Augmented reality: where we will all live”.

4. Alan B. Craig, “Understanding augmented reality: Concepts and applications”.

## **BAST- 604: C -VR for Animation**

### **Learning Outcomes**

1. To give basic understanding and the big picture of the principles,
2. methods and applications of VR, AR and related topics
3. State-of-the-art, various facets and current limitations of VR
4. Peek into the future possibilities
5. Few formulas, not very practical skills (goto ELE hands-on course)
6. Emphasis on overviews, big picture
  - a. VR is very interdisciplinary (both applications & technology), not an isolated island
  - b. VR tech is far from ripe
  - c. VR will be applied in many fields, but not only in the ways as we may think currently
7. New ideas and perspectives

### **Learning Objectives :**

1. Virtual reality took its beginning in the entertainment area, but over time it got the practical use too and education did not stand aloof.
2. The main goal of Virtual Reality in education is to make studying process exciting and more effective.
3. VR simulations provide a deep understanding of the material by a learner with its further application in real life.

### **Unit I Introduction of Unity**

Introduction of Unity, Unity Project, Unity Projects,

Assets, and Scenes, Assets and Project Files,

Navigating Scenes and Viewports, Game Objects, Transforms, and Components

Cameras, Scripting and the Unity API, Performance, Profiling, and the Stats Panel

### **Unit II Materials and Textures**

Materials and Textures, Mesh Renderers, Shaders

Materials for 2D Games, Method 1: Use White Ambient Light

Method 2: Use Light-Immune Shades, Creating Textures

Power-2 Dimensions Retain Quality, Expand Alpha Channels for Transparency

### **Unit III :Introduction**

Virtual Reality, Modern VR Experiences, History repeats.

#### **The Geometry of virtual Worlds**

Geometric Models, changing Position and orientation, Axis- Angle Representation of rotation, viewing transformation, changing the transformation

#### **Computer Graphics for virtual reality**

Graphics system and models open Graphics programming, Geometric objects and transformations.

**LIGHTING AND SHADING:** Light and Matter, Light Sources, The Phong Reflection Model, Computation of Vectors, Polygonal Shading, Subdivision, Specifying Lighting Parameters,

### **Unit IV : Visual Rendering**

Ray Tracing and shading Models, rasterization, Correcting optical Distortions, Improving latency and frame rate, immersive photos and videos.

#### **Tracking**

Tracking 2D Orientation, tracking 3D Orientation, Tracking position and orientation, tracking attached bodies, 3d Scanning of environments

**ADVANCED RENDERING:** Going Beyond Pipeline Rendering - Ray Tracing - Building a Simple Ray Tracer - The Rendering Equation - Image-Based Rendering.

**VIRTUAL REALITY MODELLING LANGUAGE:** Introduction, exploring and building a world, building object, lighting, sound and complex shapes, animation and user interaction, walk through navigation, virtual track ball navigation.

### **Practical :-**

1. Import character with mesh.
2. Create props for game design character.
3. Create a Scene in Unity.
4. Animations in Unity.
5. Creating environmental background.
6. Drawing basic 2D and 3D primitives in OpenGL.
7. Implementation of various parallel and perspective projections for simple 3D objects.
8. Simulation of various lighting and shading models. .
9. Construct the primitives with different color models
10. simulate the conversion from one model to another.
11. Develop a new texture and apply various mapping on 3D objects.
12. Use Light-Immune Shades, Creating Textures
13. Exploring and building a world, building object,
14. Building object, lighting, sound and complex shapes.
15. Building object and animation and user interaction, walk through navigation, virtual track ball navigation.

### **REFERENCES:**

1. Steven M. LaValle, “ BIRTUAL REALITY”



2. Edward Angel, “Interactive Computer Graphics: A Top-Down Approach Using OpenGL”, Addison-Wesley, 2009.
3. Foley James D, Van Dam, Feiner and Hughes, “Computer Graphics: Principles and Practice”, Pearson Education, 2002.
4. Donald Hearn and Pauline Baker, “Computer Graphics C Version”, Pearson Education, 2002.
5. David F Rogers, “Procedural Elements for Computer Graphics”, McGraw Hill, 1998.
6. OpenGL Architecture Review Board, “OpenGL Reference Manual: The Official Reference Document to OpenGL, Version 1.1”, Addison-Wesley, 1997.

## **SECC- Entrepreneurship Development**

### **Learning Objectives:**

- To develop conceptual understanding of the topic among the students and comprehend the environment of making of an Entrepreneur.

### **Learning Outcomes:**

1. To inculcate entrepreneurship skills to students.
2. To aware about industry structure and how to start up a company

### **Unit I : Entrepreneurship**

Definition, requirements to be an entrepreneur, entrepreneur and intrapreneur, entrepreneur and manager, growth of entrepreneurship in India, women entrepreneurship, rural and urban entrepreneurship.

### **Unit II : Types of Enterprises and Ownership Structure:**

Small scale, medium scale and large scale enterprises, role of small enterprises in economic development; proprietorship, partnership, Ltd. companies and co-operatives: their formation, capital structure and source of finance.

### **Unit III: Management of Enterprises**

Objectives and functions of management, scientific management, general and strategic management; introduction to human resource management: planning, job analysis, training, recruitment and selection, etc.; marketing and organizational dimension of enterprises; enterprise financing : raising and managing capital, shares, debentures and bonds, cost of capital; break-even analysis, balance sheet its analysis..

**Institutional Support and Policies:** institutional support towards the development of entrepreneurship in India, technical consultancy organizations, government policies for small scale enterprises.

**Unit IV: Projects:**

Identification and selection of projects; project report: contents and formulation, concept of project evaluation, methods of project evaluation: internal rate of return method and net present value method.

**REFERENCES:**

1. Badhai, B ‘Entrepreneurship for Engineers’, Dhanpat Rai & co. (p) Ltd.
2. Desai, Vasant, ‘ Project Management and Entrepreneurship’, Himalayan Publishing House, Mumbai, 2002.
3. Gupta and Srinivasan, ‘Entrepreneurial Development’, S Chand & Sons, New Delhi.
4. Ram Chandran, ‘Entrepreneurial Development’, Tata McGraw Hill, New Delhi
5. Saini, J. S., ‘Entrepreneurial Development Programmes and Practices’ , Deep & Deep Publications (P), Ltd.
6. Khanka, S S. ‘Entrepreneurial Development’, S Chand & Company Ltd. New Delhi

**Lab Course –IV**

**Project Information**

10- Marks for industrial training in vacation, 10 days after completion of Semester V

05- Marks for industrial visit / Excursion (Educational Tour) in Semester VI

35- Marks for project

Project Marks Distribution (35) marks

Project Viva - 05

Project Design - 25

Project Report – 05

**Note: - Project should be based on modeling, Texturing, Lighting, Rigging, Animation, Rendering and VFX**