

**UNIVERSITY OF PUNE**  
**PROPOSED STRUCTURE OF B. Sc. (Animation)**  
**(To be established from Academic Year 2010- 2011)**

**Objectives of the Course :-**

The objectives of the B.Sc.(Animation) Course shall be as follows :-

1. To familiarize the students with various approaches, methods and techniques of Animation Technology.
2. To develop competencies and skills needed for becoming an effective Animator.
3. Mastering traditional & digital tools to produce stills and moving images.
4. Exploring different approaches in computer animation.
5. To enable students to manage Animation Projects from its Conceptual Stage to the final product creation.
6. To train students in applying laws of human motion and psychology in 2-D or 3-D characters.
7. To develop expertise in life-drawing and related techniques.
8. To apply Audio and Video Production Techniques to an Animation Project.

**Eligibility :-**

- a) Higher Secondary School Certificate (10+2) or its equivalent Examination with English with any three science subjects such as Physics, Chemistry, Biology, Mathematics, Geography, biology, etc. or
- b) Three Years Diploma Course of Board of Technical Education conducted by Government of Maharashtra or its equivalent. or
- c) Higher Secondary School Certificate (10+2) Examination with English and any of the following vocational subjects in technical group of + 2 level (MCVC). e.g.

**Subjects** are.

Electrical Maintenance  
Mechanical Maintenance  
General Civil Engineering .  
Electronics  
Computer Science  
Information Technology  
Electronics Technology (J1/J2/J3 )

- d) Qualifying Elementary / Intermediate School level drawing examination is desirable.

**Admission Process :** Admission is based on the basis of Entrance Examination conducted at College level. Respective college will announce the Entrance Examination. There will be a paper of 100 ( Hundred ) Marks containing 50 questions ( Two Marks for each Question ).

Entrance test is based on the topics related with awareness of information technology, skill of visualization, lateral / create thinking, , English, non verbal reasoning & verbal reasoning.

Merit list for admission is prepared by considering 50 % of total Marks obtained in Entrance Examination and 50 % of total Marks obtained in 12<sup>th</sup> or equivalent Examination ( Mentioned in eligibility criteria ).

Reservation and relaxation will be as per the rules of University of Pune and Government of Maharashtra.

**Medium of Instruction :-**

The medium of instruction for the course shall be English.

**Duration :-**

The duration of B.Sc.(Animation) Degree Program shall be three years.

**Standard of Passing :-**

- i) In order to pass in the first year theory examination, the candidate has to obtain 40 marks out of 100 in each subject. (Minimum 32 marks out of 80 marks must be obtained in the University Examination.). There shall be continuous internal assessment of 20 Marks for each subject.
- ii) In order to pass in the second year and third year theory examination, the candidate has to obtain 20 marks out of 50 in each subject. (Minimum 16 marks out of 40 marks must be obtained in the University Theory Examination.) There shall be continuous internal assessment of 10 Marks for each subject.
- iii) In order to pass in practical examination, the candidate has to obtain 40 marks out of 100 in each subject. (Minimum 32 marks out of 80 marks must be obtained in the

University Examination.) There shall be continuous internal assessment of 20 Marks for each subject.

**Rules of A.T.K.T. :-**

Rules of A.T.K.T. of B.Sc. Degree will be applicable to this Degree Course Also.

**Fees** :- Fees of the course will be decided by competent authority of university.

**Examination Pattern :-**

**1) First Year :- Total 1200 Marks. ( Annual Pattern )**

800 Marks for 8 Theory Papers and

400 Marks for 4 Practical Courses.

Examinations will be conducted as per the University Guidelines.

**2) Second and Third Year of B.Sc.(Animation):- ( Semester Pattern )**

The Semester Pattern followed for B.Sc. Degree will be applicable.

The distribution of papers and marks shall be as follows:-

300 Marks (50 marks for each paper) for 6 Theory Papers per semester.

300 Marks for 3 Practical Courses per year.

**\*Note :-Second\_ & Third Year Practical Examination for all the Six Practical Courses will be conducted at the end of the respective Academic Year. Each Practical Course will be evaluated for 50 marks. Total Marks for Practical examination is 300. i.e.**

**SECOND YEAR PRACTICAL EXAMINATION ( Each Practical for 100 Marks )**

**1) Practical Paper I** - Practical Course Paper-I ( Sem. I ) + Practical Course Paper-I ( Sem. II )

**2) Practical Paper II** - Practical Course Paper-II ( Sem. I ) + Practical Course Paper-II ( Sem. II )

**3) Practical Paper III** -Practical Course Paper-III (Sem. I ) + Practical Course Paper-III ( Sem. II )

**THIRD YEAR PRACTICAL EXAMINATION** ( Each Practical for 100 Marks )

**1) Practical Paper I** - Practical Course Paper-I ( Sem.III ) + Practical Course Paper-I ( Sem. IV)

**2) Practical Paper II** - Practical Course Paper-II ( Sem. III ) + Practical Course Paper-II (Sem.IV )

**3) Practical Paper III** -Practical Course Paper-III (Sem.III) + Practical Course Paper-III(Sem. IV )

Examinations will be conducted as per the University Guidelines.

**Syllabus Framework :- ( Structure)**

**1) First Year B.Sc.(Animation) :-**

**Theory Courses:-**

1. Elements of Information Technology.
2. Introduction to Programming Languages.
3. Basics of Animation.
4. Foundation Art.
5. Computer Based 2D Animation.
6. Multimedia & Computer Graphics.
7. Introduction to 3D Animation & Modeling- I
8. Introduction to Mass Communication & Media Literacy.

**Practical Courses:-**

9. Practical Course Paper-I based on Theory Paper-I & II.
10. Practical Course Paper-II based on Theory Paper-III & IV.
11. Practical Course Paper-III based o Theory Paper-V .
12. Practical Course Paper-IV based on Theory Paper VI & VII.

**\* Theory & Practical Course Examination shall be conducted at the end of the Year**

**( Annual Pattern ). Rules for paper setting & assessment are according to B.Sc. examinations.**

## **2) Second Year B.Sc.(Animation) :-**

### **Semester-I**

#### **Theory Courses:-**

1. Technical English-I.
2. 3-D Animation-I.
3. Production Process-I.
4. Multimedia-I.
5. Composing and Editing.
6. Color Theory.

#### **Practical Courses:-**

1. Practical Course Paper-I based on Theory Paper-II.
2. Practical Course Paper-II based on Theory Paper-III & IV.
3. Practical Course Paper-III based o Theory Paper-V & VI.

### **Semester-II**

#### **Theory Courses:-**

1. Technical English-II.
2. 3-D Animation-II.
3. Production Process-II.
4. Multimedia-II.
5. Layout and Perspective.
6. Sketching and Landscaping.

#### **Practical Courses:-**

7. Practical Course Paper-I based on Theory Paper- II.
8. Practical Course Paper-II based on Theory Paper-III & IV.
9. Practical Course Paper-III based o Theory Paper-V & VI.

**Note: - Examination for all the Six Practical Courses will be conducted at the end of Academic Year.**

### **3) Third Year B.Sc.(Animation) :-**

#### **Semester-III**

##### **Theory Courses:-**

1. Script Writing-I.
2. Content Development Direction-I.
3. Gaming Technology
4. Digital Editing and Motion Graphics-I.
5. Visual Effects-I.
6. V.F.X.-I.

##### **Practical Courses:-**

7. Practical Course Paper-I based on Theory Paper-II.
8. Practical Course Paper-II based on Theory Paper-III & IV.
9. Practical Course Paper-III based o Theory Paper-V & VI.

#### **Semester-IV**

##### **Theory Courses:-**

1. Script Writing-II.
2. Content Development Direction-II.
3. Gaming Production
4. Digital Editing and Motion Graphics-II.
5. Visual Effects-II.
6. V.F.X.-II.

##### **Practical Courses:-**

7. Practical Course Paper-I based on Theory Paper-II.
8. Practical Course Paper-II based on Theory Paper-III & IV.
9. Practical Course Paper-III based o Theory Paper-V & VI.

## Syllabus details of the First Year B.Sc.(Animation):

### Paper – 1 : Elements of information Technology

#### **1 Ch 1: Introduction to Computers** (12)

- 1.1 Introduction
- 1.2 Characteristics of Computers
- 1.3 Block diagram of computer
- 1.4 Types of computers and features
  - 1.4.1 Mini Computers
  - 1.4.2 Micro Computers
  - 1.4.3 Mainframe Computers
  - 1.4.4 Super Computers
- 1.5 Types of Programming Languages
  - 1.5.1 Machine Languages
  - 1.5.2 Assembly Languages
  - 1.5.3 High Level Languages
- 1.6 Data Organization
  - 1.6.1 Drives
  - 1.6.2 Files
  - 1.6.3 Directories
- 1.7 Types of Memory (Primary & Secondary)
  - 1.7.5 Secondary Storage Devices (FD, CD, HD, Pen drive)
- 1.8 I/O Devices
  - 1.8.1 Scanners
  - 1.8.2 Digitizers
  - 1.8.3 Plotters
  - 1.8.4 LCD
  - 1.8.5 Plasma Display

#### **Ch 2: Algorithm and Flowcharts** (8)

- 2.1 Algorithm
  - 2.1.1 Definition
  - 2.1.2 Characteristics
  - 2.1.4 Examples
- 2.2 Flowchart
  - 2.2.1 Definition
  - 2.2.2 Define symbols of flowchart
  - 2.2.4 Examples

#### **Ch 3: Introduction to Operating System** (4)

- 3.1-Introduction
- 3.2 Files and Directories
- 3.3 Types of O.S.

**Ch 4: Windows Operating Environment** (12)

4.1 Features of MS – Windows

4.1.1 Control Panel

4.1.2 Taskbar

4.1.3 Desktop

4.1.4 Windows Application

4.1.5 Icons

4.2 Windows Accessories

4.2.1 Notepad

4.2.2 Paintbrush

**Ch-5: Introduction to HTML** (12)

5.1 Basic Concepts

5.2 What is HTML

5.3 Editing & Viewing HTML Files

5.4 Document Setting & Formatting

5.6 Document structures, Tags & Hyperlinks

**Ch 6: Style Sheets & Graphics in HTML** (12)

6.1 Understanding styles

6.2 Style rules

6.3 Creating styles for tags

6.4 Creating classes & applying style

**Ch 7: Formatting text & paragraphs in HTML** (12)

7.1 Introduction to Font family

7.2 Style sheets

7.3 Displaying graphics

**Ch 8: Page Layout & Navigation in HTML** (12)

8.1 Navigational Aids

8.2 Layouts, Tables & Forms

8.3 Incorporating Sound & Video

**Reference Books :**

1. Fundamental of Computers – By V. Rajaraman B.P.B. Publications

2. Fundamental of Computers – By P. K. Sinha

3. MS- Office 2000(For Windows) – By Steve Sagman

4. Step by Step HTML 5- By Faithe Wempen PHI Publication



## Paper – 2 : Introduction to Programming Languages

### C Programming

#### **Introduction to Problem Solving:** (8)

Flow charts, Tracing flow charts, Problem solving methods, Need for computer Languages, Sample Programs written in C C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements and symbolic constants

#### **Input-Output:** (4)

getchar, putchar, scanf, printf, gets, puts, functions.

#### **Preparing and running a complete C program Operators and expressions:** (6)

Arithmetic, unary, logical, bit-wise, assignment and conditional operators

#### **Control statements:** (6)

While, do-while, for statements, nested loops, if else, switch, break, Continue, and goto statements, comma operators

#### **Functions:** (4)

Defining and accessing, passing arguments, Function prototypes, Recursion, Library functions, Static functions

#### **Arrays:** (8)

Defining and processing, Passing arrays to a function, Multi dimensional arrays.

#### **Strings:** (4)

Defining and operations on strings.

#### **Pointers:** (8)

Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers function pointers.

### Python Programming

**Note :** Following link is used for MIT OCW which can be used as a starting point for this course.

<http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-00sc-introduction-to-computer-science-and-programming-spring-2011/index.htm>

#### **A) The Way of the Program** (8)

1. The way of the program.
2. Basic concepts: program, interpreter, compiler, programming languages, solving a problem.
3. What is debugging?
4. Program errors: syntax, semantic and runtime errors.
5. Experimental Debugging.
6. Formal and natural languages.
7. The first program.

#### **Variables, expressions, and statements** (6)

1. Values and Types.
2. Variables.
3. Variable Names and Keywords.
4. Python Statements.

5. Evaluating Expressions.
6. Operators and Operands.
7. Order of Operations.
8. Operations on Strings.
9. Composition.
10. Comments.

## **Functions**

(6)

1. Function Calls.
2. Type Conversion.
3. Type Coercion.
4. Math Functions.
5. Composition.
6. Adding New Functions
7. Function Definitions and Use.
8. Flow of Execution.
9. Parameters and Arguments.
10. Variables and Parameters are Local.
11. Stack Diagrams.
12. Functions with Results.

## **Conditionals and Recursion**

(6)

1. The Modulus Operator.
2. Boolean Expressions.
3. Logical Operators.
4. Conditional Execution.

## **Lists**

(8)

1. Lists.
2. List Values.
3. Accessing Elements.
4. List Length.
5. List Membership.
6. List and for Loops.
7. List Operations.
8. Drawing shapes.

## **Dictionaries**

(6)

1. Dictionaries.
2. Dictionary Operations.
3. Dictionary Methods.
4. Aliasing and Copying

## **Files and Exceptions 1.**

(4)

- Files and Exceptions.
2. Text Files.
3. Writing Variables.
4. Directories.
5. Pickling. Exceptions.

## GUI Programming

(4)

1. Graphical User Interfaces.
2. The main ideas.
3. The simplest GUI program in Python
4. Event-driven programming.
5. Terminology.
6. Changing the layout.
7. Getting input from the user.
8. GUI Examples:
9. Designing a GUI.

### Reference Books:

- C Programming Language (2nd Edition) Brian W. Kernighan , Dennis M. Ritchie , ISBN 978-0131103627
- Programming with C: Bryon Gottfried
- Let us C : Yashwant Kanetkar.
- PYTHON FOR SOFTWARE DESIGN: How to Think Like a Computer Scientist, Allen B. Downey, Cambridge University Press, ISBN: 9780521725965, 978-0521725965
- Python Programming Fundamentals by Kent D. Lee Publisher: Springer, ISBN: 9781849965361, 978-1849965361
- Fundamentals of Python: First Programs, Kenneth A. Lambert, Martin Osborne ISBN-13: 9781111822705,978-1111822705 Publisher: Course Technology,
- Programming With Python: A User's Book by Michael Dawson,Michael Dawson Cengage Learning ( Thompson )

### Paper -3 : Basics of Animation

1. History of Animation ( 2 )
2. Introduction to Animation (2)
3. Terms used in Animation ( 2 )
4. Types of Animation ( 4 )\
5. Skills for Animation Artist ( 8 )\
6. Basic Principles of Animation ( 4 )
7. Animator's Drawing Tools ( 6 )
8. Rapid Sketching & Drawing ( 8 )
9. Developing Animation Character ( 12 )

10.	Anatomy & Body Language	( 10 )
11.	Introduction to equipment required for animation	(2)
12.	Developing the characters with computer animation.	(6)
13.	2 D virtual drawing for animation, sequential movement drawing	(8)
14.	Thumbnails, motion studies , drawing for motion.	(6)
15.	Essentials & qualities of good animation characters	(2)
16.	Three dimensional drawings of characters	(8)

**Reference Book :**

- The Complete Animation course by Chris Patmore, By – Barons Educational Series (New York )
- Anatomy of the Artist – Thompson & Thompson

**Paper 4 : Foundation Art.**

1.	Skills required for an animation artist	(5)
2.	Visual and creative development of an artist	(5)
3.	How to draw gestures,	(6)
4.	Basic Proportions	(6)
5.	Heads	(4)
6.	Rotation in Arcs	(4)
7.	Key Lines	(4)
8.	Perspective	(6)
9.	Mannequin	(4)
10.	Volume Construction	(4)
11.	Balance	(3)
12.	Muscles	(3)

13. Light & shade	(4)
14. Shape and Action	(4)
15. Hands & Legs	(4)
16. Foreshortening	(3)
17. Facial expressions .	(4)
18. Introduction to pose to pose sketching (Action analysis).	(4)
19, Introduction to Acting, Modelling, Sketching from Acting, Sketching from live models	(4)
20. Introduction to Rapid Sketching Techniques, Sketching from Memory, live action.	(4)

**Reference Books :**

1. Figure Study Made Easy By- Aditya Chari -- Grace Publication
2. Perspective By Milind Mulik -- Jyotsna Prakashan

**Paper – 5 : Computer Based 2 D Animation**

1. Overview of Flash	(6)
2. Introduction to the flash interface	(4)
3. Setting stage dimensions, working with panels, panel layouts	(3)
4. Introduction to drawing and drawing tools in Flash	(4)
5. Panels - Description , modifying , Saving & deleting a panel	(3)
6. Layers & Views	(8)
7. Shaping Objects – Overview of shapes, Drawing & Modifying Shapes	(10)
8. Basic Principles of Text	(8)
9. Bitmap Images & Sounds	(10)
10. Object Selection, working with objects & transforming Objects	(10)
11. Animation -Principles , Frame by frame animation, tweening, masks	(12)
12. Building a Movie- Symbol, Libraries, Structure & Exporting Movie	(12)

## **Reference Book :**

1. Flash CS4 Professional Bible Published by Wiley Publishing ( Robert R & Snow D.)
2. FLASH MX For PC/Mac Published by – FIREWALL MEDIA – Laxmi Publications

## **Paper – 6 : MULTIMEDIA AND COMPUTER GRAPHICS**

- 1) Multimedia Communications:** ( 10)
  - 1.1 Introduction
  - 1.2 Multimedia information representation
  - 1.3 Multimedia networks
  - 1.4 Multimedia applications
  - 1.5 Application and networking terminology
  - 1.6 Multimedia information representation:
    - 1.6.1 Digitization
    - 1.6.2 Principles
    - 1.6.3 Text and Images
    - 1.6.4 Audio and video.
- 2) Text and image compression** (08)
  - 2.1 Introduction
  - 2.2 Compression principles
  - 2.3 Text compression
  - 2.4 Image compression
  - 2.5 Various methods of text and image compression.
- 3) Audio and video compression** (06)
  - 3.1 Text compression
  - 3.2 Image compression
  - 3.3 Various methods of audio compressions and video compressions
- 4) Enterprise networks** (10)
  - 4.1 Introduction
  - 4.2 LAN's, Ethernet/IEEE 802.3, token ring, bridges, FDDI
  - 4.3 High speed LAN's, LAN protocols
  - 4.4 Multisite LAN interconnection technologies.

**5) Introduction to Computer Graphics (12)**

- 5.1 Definition Application
- 5.2 Pixel and Frame Buffer
- 5.3 Raster and Random Scan display
- 5.4 Display devices-CRT, Color CRT Monitors Scan
- 5.5 Conversion of line- DDA algorithm of line drawing
- 5.6 Scan conversion of circle- Bresenham's circle generating algorithm
- 5.7 Polygon Filling- Scan line polygon filling algorithm.

**6) 2D and 3D (10)**

- 6.1 2-Dimensional transformation
- 6.2 Translation, Rotation, Scaling,
- 6.3 Homogeneous Coordinates, Reflection, Shear.
- 6.4 3-dimensional transformation,
- 6.5 Translation, Rotation Scaling, Reflection, Shear.

**7) Clipping (09)**

- 7.1 Window to view port transformation
- 7.2 Clipping, line clipping,
- 7.3 Cohen –Sutherland line clipping
- 7.4 Polygon clipping
- 7.5 Sutherland and Gary Hodgman polygon clipping algorithm.

**8) Computer Graphics Algorithm (15)**

- 8.1 Hidden Surface removal—Depth comparison,
- 8.2 Z-Buffer Algorithm
- 8.3 Back-Face Removal
- 8.4 The Painter's Algorithm
- 8.5 Scan-Line Algorithm
- 8.6 Subdivision Algorithm
- 8.7 Light and Color
- 8.8 Different color models, RGB, CMY, YIQ.

**Reference Books:**

1. Multimedia Communications- Applications, Networks, Protocols & Standards By Fred Halsall., Pearson Publications
2. Computer Graphics – By Zhigang Xiang and Roy Plasock, Tata McGraw Hill
3. Multimedia Communication Systems - By K.R. Rao, Zoran S.B. & Dragorad A.M. – PHI Publications

4. Computer Graphics By- Rajesh Maurya – Wiley Publications
5. Computer Graphics – By- Donald D. Hearn & M. Pauline Baker PEARSON PUBLICATION

**Paper – 7: Introduction to 3 D Animation & Modeling - I**

1. Introduction & Context for 3 D Studio Max. (6)
2. Exploring the Max Interface (5)
3. Controlling & Configuring the view ports (5)
4. Working with Files, importing & exporting (4)
5. Creating & editing primitive objects (8)
6. Selecting Objects & setting object properties (6)
7. Transforming objects, pivoting, aligning & snapping (6)
8. Cloning objects & Creating object arrays (4)
9. Grouping & Linking objects (4)
10. Accessing sub objects and using modeling helpers (6)
11. Introduction to modifier & using modifier stack (6)
12. Drawing & Editing 2 D Spines & shapes (8)
13. Modeling with polygon & Patch (8)
14. Using the Graphic Modeling & Painting with objects (12)

**Reference Book :**

3ds Max- Bible 2011

By – Kelly L. Murdock WILEY PUBLICATIONS



## **Paper 8: Introduction To Mass Communication & Media Literacy**

1. Mass Communication, culture & Media literacy (8)
2. The Evolving Mass Communication Process (5)
3. Media, Media Industries & Media Audiences (6)
  - 3.1 Books (6)
  - 3.2 Newspapers (4)
  - 3.3 Magazines (5)
  - 3.4 Films (5)
  - 3.5 Radio & Recording (5)
  - 3.6 Television & Mobile Video (6)
  - 3.7 Video Games (5)
  - 3.8 The internet & Web (5)
4. Supporting Industries (6)
  - 4.1 Public Relations (6)
  - 4.2 Advertising (8)
  - 4.3 Theories & Effect of Mass Communication (6)
  - 4.5 Media Freedom, Regulations and ethics (8)
  - 4.6 Global Media (8)

### **Reference Books :**

1. Introduction to mass Communication : Medial Literacy & Culture  
By Stanley Baran The Tata McGraw Hill
2. The Media in your life -  
By Jean Folkerts & Stephen Lacy by PEARSON PUBLICATION