**Program Name** : **Diploma in Information Technology**

**Program Code** : **IF**

**Semester** : **Third**

**Course Title** : **Applied Multimedia Techniques**

**Course Code** : **22024**

## 1. RATIONALE

Multimedia application is the combined use of text, graphics, animation, audio, and video which can be used for entertainment, Business, and in Education to enhances communication and learning. The multimedia components like video, animation, still images, audio components and text can be developed using various tools. This practical oriented course enables the students to use audio and video files available in different formats and implement their creative imagination to produce graphics and animated multimedia objects that can be used in an application.

## 2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Develop Applications using core Graphical Concepts.**

## 3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following ***industry oriented*** COs associated with the above mentioned competency:

a. Prepare images using different color models.
b. Edit images using Graphical processing tools.
c. Build website with multimedia contents.
d. Develop 2D animation objects.
e. Develop 3D animation objects.

## 4. TEACHING AND EXAMINATION SCHEME

| Teaching Scheme | | | Credit (L+T+P) | Examination Scheme | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | | | | | | Practical | | | | | |
| L | T | P | | Paper Hrs. | ESE | | PA | | Total | | ESE | | PA | | Total | |
| | | | | | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min |
| 2 | - | 4 | 6 | -- | -- | -- | -- | -- | -- | -- | 50# | 20 | 50~ | 20 | 100 | 40 |

'#': No Theory Examination,(~[2]): For the courses having only practical, the PA has two parts (i) Practical part-30 marks (60%) (ii) Micro project part- 20 marks (40%).
**Legends: L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** - Practical; **C** – Credit, **ESE** - End Semester Examination; **PA** - Progressive Assessment

## 5. COURSE MAP (with sample COs, PrOs, UOs, ADOs and topics)

This course map illustrates an overview of the flow and linkages of the topics at various levels of outcomes (details in subsequent sections) to be attained by the student by the end of the

course, in all domains of learning in terms of the industry/employer identified competency depicted at the centre of this map.

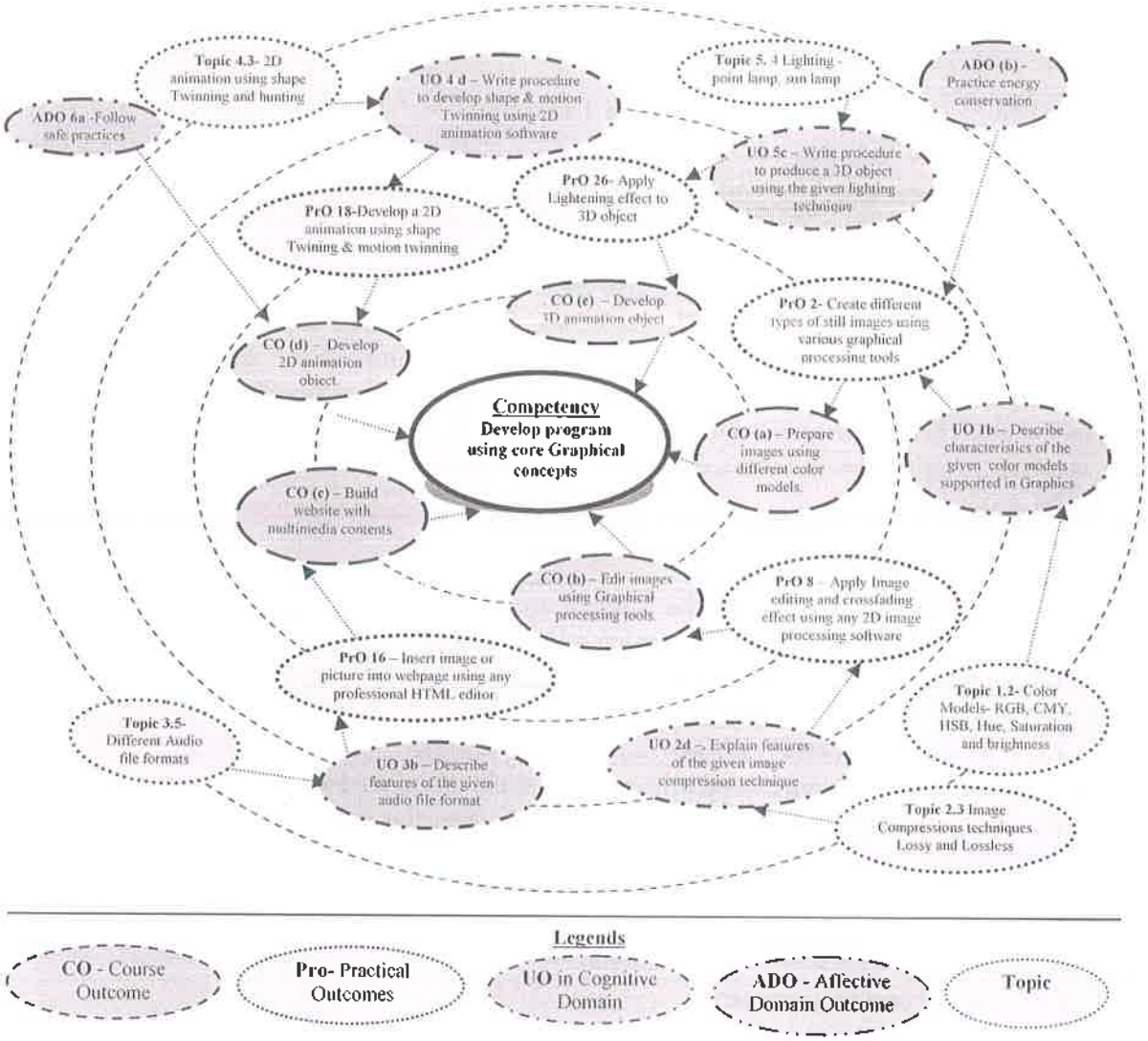


**Figure 1 - Course Map**

## 6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. Required |
|---|---|---|---|
| 1 | (a) Use various graphics processing tools.<br>(b) Convert given image into different image formats and observe the changes in image quality and file size. | I | 02* |
| 2 | Create different types of still images using various graphical processing tools. | I | 02 |
| 3 | Develop images using RGB/ CMY/ HSB color models. | I | 02 |
| 4 | Develop simple movie clip using movie maker. | I | 02 |
| 5 | Develop GIF image using graphics processing tool. | II | 02* |
| 6 | Design Banner using graphics processing tool. | II | 02 |

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. Required |
|---|---|---|---|
| 7 | Apply different word art on text using any 2D image processing software. | II | 02 |
| 8 | Create Wallpaper using various tools of 2D image processing software. | II | 02 |
| 9 | Apply various effects (Drop Shadow, vignette, mirror, reflection) on text using any 2D image processing software. | II | 02 |
| 10 | Apply Image editing and crossfading effect using any 2D image processing software. | II | 02 |
| 11 | Create images based on layers. | II | 02 |
| 12 | Merge multiple photographs using any 2D image processing software. | II | 02 |
| 13 | Apply Rotate and change rotation center operation to an image using any 2D image processing software. | II | 02 |
| 14 | Modify existing image by adding Rainy Season effect using 2D image processing software. | II | 02 |
| 15 | Design a stylish image using 2D image processing software. | II | 02 |
| 16 | Design wallpaper showing water drop effect in image. | II | 02 |
| 17 | Design poster by using different Text effect (Ketchup, rope, Fire, fruit). | II | 02 |
| 18 | Apply special effects like broken mirror effect, Flaming ball effects to an image. | II | 02 |
| 19 | Convert image in different format using relevant software. | II | 02 |
| 20 | Insert image or picture into webpage using any professional HTML editor. | III | 02* |
| 21 | Develop a webpage which show animation with sound effect using any professional HTML editor. | III | 02 |
| 22 | Develop a webpage by Embedding video. | III | 02 |
| 23 | Develop a 2D animation using Shape Twinning and Motion Twinning. | IV | 02* |
| 24 | Develop different types of symbols (button symbol, graphic, movie clip symbol and similar types of icons). | IV | 02 |
| 25 | Create 2D Animation using Motion guide layer and Masking. | IV | 02 |
| 26 | Create 2D Animation for Bouncing and Rolling ball down. | IV | 02 |
| 27 | Design simple 3D animation using basic shapes. | V | 02* |
| 28 | Object creation, types and development methods, sample model development. | V | 02 |
| 29 | Object creation of different types- primitives, compound objects, lofting, lathe, Boolean creation methods. | V | 02 |
| 30 | Design Metallic text in 3D animation tool. | V | 02 |
| 31 | Apply Lighting effect to 3D object. | V | 02 |
| 32 | Render the animation by review key framing, animating props and cameras, render settings to prepare a scene. | V | 02 |
| | **Total** | | **64** |

***Note***

i. *A suggestive list of **PrOs** is given in the above table. More such PrOs can be added to attain the COs and competency. A judicial mix of minimum 24 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.*

ii. *The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:*

| S. No. | Performance Indicators | Weightage in % |
|---|---|---|
| 1 | Use of relevant graphical tools to create, edit given Multimedia object. | 20 |
| 2 | Aesthetics of developed product. | 20 |
| 3 | Precision of output for given task. | 30 |
| 4 | Able to answer oral questions. | 15 |
| 5 | Submission of report in time. | 15 |
| | **Total** | **100** |

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

a. Follow safety practices.
b. Practice good housekeeping.
c. Demonstrate working as a leader/a team member.
d. Follow ethical practices.

The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organising Level' in 2nd year and
- 'Characterising Level' in 3rd year.

## 7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of experiments, as well as aid to procure equipment by authorities concerned.

| S. No. | Equipment Name with Broad Specifications | PrO S. No. |
|---|---|---|
| 1. | Hardware: Personal computer Pentium IV, 2 GHz minimum (i3-i5 preferable), RAM minimum 2 GB. | For all Experiments |
| 2. | Graphics and animation development tools preferably Open source based Software: Gif animation tool, Pencil, Synfig Studios, Stykz, Blender, Sci lab or any other Multimedia graphics processing tool. | |

## 8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added:

| Unit | Unit Outcomes (UOs) (in cognitive domain) | Topics and Sub-topics |
|---|---|---|
| **Unit – I Introduction to Multimedia** | 1a. Describe characteristics of the given color model supported in Graphics.<br>1b. Differentiate Representation of the given media.<br>1c. Describe the phases of the given Multimedia application development Life cycle with an example<br>1d. Explain the concept of the given Virtual Reality with example. | 1.1. Vector and Raster Graphics in multimedia, Regular text vs. anti-aliased text , Standard selection vs. floating, selection, Tolerance and Opacity<br>1.2. Color Models – RGB, CMY, HSB, Hue, saturation, and brightness,<br>1.3. Concepts of Multimedia: Types, Use of Multimedia.<br>1.4. Basics of Graphics – Basic Shapes: Line, Circle, Rectangle; Hardware Requirements and Software Requirements (Color Model in different Software), Characteristics of Multimedia.<br>1.5. Analog and Digital Representation of media.<br>1.6. Creating Multimedia based application, Multimedia Authoring.<br>1.7. Fundamentals of Virtual Reality, its applications |
| **Unit– II Image Editing and Compression.** | 2a. Describe use of the given image/graphic manipulation tool.<br>2b. Identify changes occurred in the given file size, and image quality after format conversion.<br>2c. Describe the given image editing operation on an image.<br>2d. Explain features of the given image compression technique.<br>2e. Write major steps to develop the given GIF image/ banner using Gif animator software. | 2.1 Image Types: Raster Format, Bitmap (BMP) Format, Graphics Interchange Format (GIF), Joint Photographic Experts Group (JPEG), Tagged Image File Format (TIFF), Portable Network Graphics (PNG) and their differences.<br>2.2 Basic operations on image: Crop, Resize, Complement<br>2.3 Image Compressions techniques Lossy and Lossless.<br>2.4 Effects and its types: Fonts and its types, Text effect (Ketchup, rope, Fire, fruit), Image Effect broken mirror effect, Flaming ball effects, water drop effect in image. |
| **Unit – III Webpage Development Using Multimedia** | 3a. Write steps to develop a webpage comprising of graphical media using a HTML composer for the given situation..<br>3b. Describe features of the given audio file format.<br>3c. Differentiate between the two | 3.1 Create Simple Two-Column Web Page with Header and Footer.<br>3.2 Design Home Page.<br>3.3 Hypertext and Hypermedia.<br>3.4 Upload or Publish Web Page.<br>3.5 Different Audio file formats: Uncompressed audio format, Lossless compressed audio format, |

| Unit | Unit Outcomes (UOs) (in cognitive domain) | Topics and Sub-topics |
|---|---|---|
| | types of audio.<br>3d. Describe features of the given video file format. | Lossy compressed audio format. mp3, wav, mpeg-4, wma, pcm. MIDI Versus Digital Audio.<br>3.6 Video file Formats: MPEG: MPEG1, MPEG2, MPEG4, AVI |
| **Unit – IV Create 2D animation** | 4a. Write steps to modify the given type of 2D still elements.<br>4b. Describe use of the given graphical manipulation tool to create a 2D object.<br>4c. Write steps to create the given 2D animation effect on a text.<br>4d. Write procedure to develop the given Shape and Motion Twining using 2D animation software. | 4.1 Create and modify 2D elements. 2D versus 3D<br>4.2 Line tool, Fill/Attributes, Different shapes, text tools and pen tool<br>4.3 2D animation: Animation basics, Timeline, Frames and Key Frames, Creating a basic text animation, Creating and manipulating animations, Creating a basic frame-by-frame animation, Using Onion Skin to modify an animation, Using shape twining and hinting, Using motion twining with a guide, Mask Animations |
| **Unit– V Create 3D animation** | 5a. Describe use of the given graphical manipulation tool to create a 3D object.<br>5b. Write procedure to apply the given modeling operation on a 3D object.<br>5c. Write procedure to produce the given 3D object using the given lighting technique.<br>5d. Write procedure to develop the given Shape and Motion Twining using 3D animation software. | 5.1 3D Animation: Manipulate Objects in 3D<br>5.2 Edit mode/Mesh Modeling.<br>5.3 Object / Edit Mode Modeling: Empty Object, Background Image, Parenting Objects, Joining Objects, Separating Objects.<br>5.4 Lighting: Point Lamp, Sun Lamp<br>5.5 Animation in 3D: Basic Key frame Animation, Graph Editor, Cyclic Animation, Path Animation |

*Note: To attain the COs and competency, above listed UOs need to be undertaken to achieve the 'Application Level' of Bloom's 'Cognitive Domain Taxonomy'.*

## 9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

--Not applicable –

## 10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

a. Prepare journals based on practicals performed in laboratory.
b. Give seminar on relevant topic.

c. Library/E-Book survey regarding multimedia techniques used in industries.
d. Prepare web site including different types of multimedia application.

## 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a. Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.
b. ***'L' in item No. 4*** does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
c. About ***15-20% of the topics/sub-topics*** which is relatively simpler or descriptive in nature is to be given to the students for ***self-directed learning*** and assess the development of COs through classroom presentations (see implementation guideline for details).
d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.
e. Guide student(s) in undertaking micro-projects.
f. Discuss with student(s) thoroughly so as to visualize the required output.
g. Guide students in creating multimedia object(s) and applying it in relevant application.
h. Involve each student to ensure their participation in the entire practical performed.

## 12. SUGGESTED MICRO-PROJECTS

***Only one micro-project*** is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be ***individually*** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should ***not exceed three.***

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than ***16 (sixteen) student engagement hours*** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

a. Create collage of main annual events of the institute.
b. Build Interactive animated web page.
c. Design Personnel Portfolio using 2D Animation.
d. Create animation to show action of internal parts inside the hand pump/two stroke engine.
e. Modeling a cartoon character in 3D graphic processing tool.

Any other micro-projects suggested by subject faculty on similar line.
(Use structure and other features of graphics processing tools suggested in Section 7.)

## 13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication |
|---|---|---|---|
| 1 | Principles of Multimedia 2e | Parekh, Ranjan | McGraw Hill Education, New Delhi. 2015, ISBN-13:978-1-25-900650-0 |
| 2 | Multimedia Systems and Design | Andleigh, Prabhat K.Thakrar , Kiran | PHI Learning, New Delhi 2013 ISBN: 81-203-2177-4 |
| 3 | Fundamentals of Multimedia | Li , Ze - Nian | PHI Learning, New Delhi 2013 ISBN-13: 978-8120328174 |
| 4 | Multimedia: Making It Work,9e | Vaughan Tay | McGraw Hill Education, New Delhi. 2015, **ISBN:** 9780071832885 |

## 14. SUGGESTED SOFTWARE/LEARNING WEBSITES

a. https://www.youtube.com/watch?v=7FSxJJ5-SZ8
b. https://www.youtube.com/watch?v=faWNkTPKKjg
c. http://gryllus.net/Blender/Lessons/Lesson02.html
d. https://www.thesitewizard.com/gettingstarted/dreamweaver1.shtml
e. https://www.youtube.com/watch?v=OGa61mDT4a4
f. https://www.youtube.com/watch?v=zYA4gYho5vo
g. https://www.youtube.com/watch?v=9KOVgLsvHYM