



## STUDY OF THE INDIAN ANIMATION INDUSTRY AND PLANNING THE DIPLOMA PROGRAMME IN COMPUTER ANIMATION ENGINEERING

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### ABSTRACT

Emerging technology of Computer Animation Industry influences the society and the animation industry is one of the fastest growing industries. Today, animation industry is not just restricted to movies, but also it has another dimension to the entertainment, gaming, advertising, presentation, commercials, documentaries, medical visualization and training, industrial, architectural, home and building design, even aerospace, forensics, etc. Animators could find employment in the Animation industry. This paper analyses the market potential of Indian Animation Industry and how the industry required skilled manpower can be met by developing the Diploma Programme in Computer Animation Engineering. This new programme would utilize the existing infrastructure and resources and would meet the demands of the animation industry. The open source software could be used. The existing infrastructure could be optimally used. The existing faculty could be trained.

**KEYWORDS:** Animators, VFX, Animation services, Animation Movies, Diploma Programme in Computer Animation Engineering.

### INTRODUCTION

The Indian Media and Entertainment (M&E) industry is a sunrise sector for the economy and is making high growth marks in the recent period, backed by surging consumer demand and improving advertising revenues which has been largely driven by increasing digitization and higher internet usage over the last decade. Animation, VFX, Gaming and Comics (AVGC) sector is a fast developing and showing potential for higher growth which plays a major role in contributing the economics in the emerging M&E sector.

As India is progressing towards the world economy, it is inevitable without becoming a 'knowledge economy', in which the skill sets can range from professional, conceptual, managerial, operational behavioral to interpersonal skills and inter domain skills. In the 21<sup>st</sup> century, as science progresses towards globalization, knowledge domains and skill domains also multiply and become more and more complex to cope with this level of complexity. The Eleventh Five Year Plan (2007-2012) has given a very high priority to technical and polytechnic education so as to bridge the gaps in the industry requirement and supply of knowledge and skill pool. The existing diploma programme in Computer Science and Engineering could not meet the needs of Animation industry. Many training institutions have come up to provide industry relevant technicians. Till now there is no specific diploma programme in Computer Animation Engineering.

(Source: [http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11\\_v2/11th\\_vol2.pdf](http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v2/11th_vol2.pdf) Page-29)

### OBJECTIVES

To meet the needs of the Animation Industry, a Diploma Programme in Computer Animation Engineering is proposed. The objectives of the present study are:

1. To analyse the market potential of the Indian animation industry.
2. To examine the existing infrastructure and the resources of the Diploma Programme in Computer Science and Engineering.
3. To identify the open source software and training needs of the faculty members for the diploma in Computer Animation Engineering.
4. To design Diploma Programme in Computer Animation Engineering and the course structure to suit the needs of the animation industry.

### GROWING MARKET POTENTIAL

The rapid advancement of technology has made computer available to the masses and the animation industry is one of the fastest growing industry. The demand for animated entertainment has expanded with the increase in broadcasting hours by cable and satellite TV along with the growing popularity of the Internet. In the past, animation series were

targetted at children aged nine and below. Nowadays, TV stations have been broadcasting animation series for teenagers, adults and the whole family.

Another key trend we are witnessing is the outsourcing of animation content to Asia by North American film and television program procedures. The major factor behind this shift of computer animation production to the Asia/Pacific region continues to be the availability of low cost, powerful computer animation platforms. The bulk of the outsourcing happens for 2D animation content with some amount of 3D content.

(Source: <http://www.researchandmarkets.com>)

## CURRENT STATE OF INDIAN ANIMATION INDUSTRY

There is a huge amount of 2D and 3D animation contents outsourced to India. India is a fast growing alternative to its Asian competitors in animation outsourcing. India is also emerging as a post-production hub for animation which involves a lot of ink, paint and compositing and scanning work. We may observe that the animation industry is following a similar evolutionary part as the software industry. It was the low value jobs which were shifted to India in the early stages of the evolution of the Indian software industry. Over a period of time it is projected that more and more high value jobs would be outsourced to India. It is easier for a studio in the US to outsource its post production work due to competitive labor cost which has made India as an attractive destination for animation outsourcing.

(Source: <http://www.vpgmarketresearch.com>)

## KEY TRENDS IN INDIAN ANIMATION INDUSTRY

- Indian animation companies are moving up the value chain to own and co-produce intellectual property rights. This is a major change from their business model of outsourcing animation production from international studios.
- To establish the global market presence, the Indian animation companies are focusing on strategic alliances with overseas studios.
- Content creation in the country has peaked and big Indian studios are increasingly making their presence felt in foreign markets.
- Indian studios are rapidly converting into modularization wherein expert from multiple animation companies, come together to execute specific functions in the production value chain and execute the work in modular units without loss of time or quality.
- Large domestic demand for local animation content is rising due to the tremendous success of the movies and

television characters. The television industry airing more animated programmes through dedicated channels to target the audiences not only the kids, but the whole family.

- The animation content in the Indian television sector crosses more than 350 shows which signifies the consumption and growth of the domestic market
- Indian cities such as Mumbai, Hyderabad, Chennai, Ahmadabad, Pune, Trivandrum and Bangalore are offering a state-of-the-art mix of software skills, production and animation expertise and studio infrastructure.
- The demand for Indian animation production for export comes mainly from feature film producers and distributors, broadcasting channels, game software producers and advertisement film producers.

(Source: <http://www.vpgmarketresearch.com>)

## INDIAN ANIMATION INDUSTRY BUSINESS MODELS AND SEGMENTS

Indian Animation companies are following the three prominent business models which are Outsourced animation services, Collaborative animation services and In-house production. The Animation Industry in India has the following segments: Animation services, Animation production, VFX and Postproduction.

## INDIAN ANIMATION INDUSTRY PERFORMANCE AND PROJECTION

The Indian Media & Entertainment (E&M) Industry has registered the overall growth of 12.8 percent to hit US\$17.315 billion by 2015 and the forecast of the industry for the year 2020 is US\$ 33.82 billion with the projected growth rate of 14.3 percent. (Refer Table 1)

The Indian animation market is registered an overall growth of 13.8 percent to hit US\$ 765 million by 2015. The gaming market has reached US\$397 million mark with the growth rate of 12.8 percent by 2015. The total animation production by Indian producers has been expected to touch US\$ 1,618 million by 2020 at the growth rate of 16.1 percent (Refer Table 1). The worth of the gaming market has been projected to hit US\$759 million with the growth rate of 13.9 percent by the year 2020. (Refer Table 1)

(Source: <https://home.kpmg.com>)

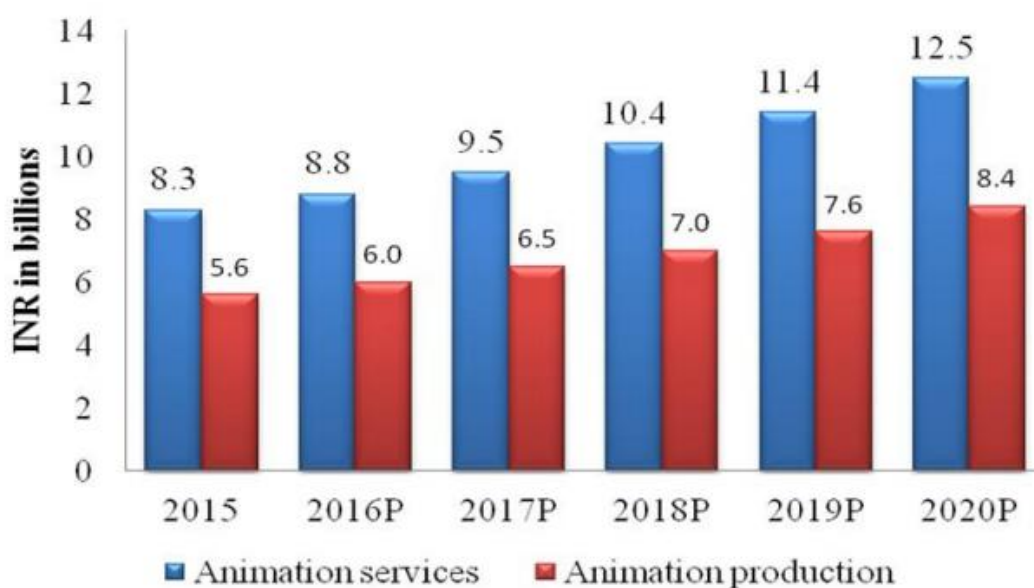
The year on year growth with CAGR% has been projected for the period 2016 and 2020 in the chart 1 and chart 2 for the Animation Industry which includes VFX and Post production.

**Note:** Exchange rate of 1 US\$ = INR 66.424 (As on 11.06.2016)

**Table – 1 Projected growth of M&E sector for the period 2016- 2020**

Overall Industry size (INR billion) (For calendar years)	2016P	2017P	2018P	2019P	2020P	CAGR (2015 -2020)
<b>TV</b>	617.0	709.6	823.3	956.8	1097.6	<b>15.1%</b>
<b>Print</b>	305.2	329.6	355.9	383.6	412.5	<b>7.8%</b>
<b>Films</b>	158.7	174.1	190.0	207.8	227.3	<b>10.5%</b>
<b>Radio</b>	23.4	28.4	32.7	37.8	43.3	<b>16.9%</b>
<b>Music</b>	12.1	14.0	16.1	18.4	20.6	<b>13.8%</b>
<b>OOH</b>	28.3	31.6	35.4	40.0	45.2	<b>13.1%</b>
<b>Animation and VFX</b>	58.3	67.1	78.1	91.3	108.0	<b>16.1%</b>
<b>Gaming</b>	30.8	34.4	39.0	45.4	50.7	<b>13.9%</b>
<b>Digital Advertising</b>	81.1	113.6	153.3	199.3	255.2	<b>33.5%</b>
<b>Total</b>	<b>1,315</b>	<b>1,502</b>	<b>1,724</b>	<b>1,980</b>	<b>2,260</b>	<b>14.3%</b>

(Source: KPMG in India analysis,2016)

**Chart - 1 Projected growth of Animation services, Animation production, VFX and Post production sector for the period 2016 – 2020**

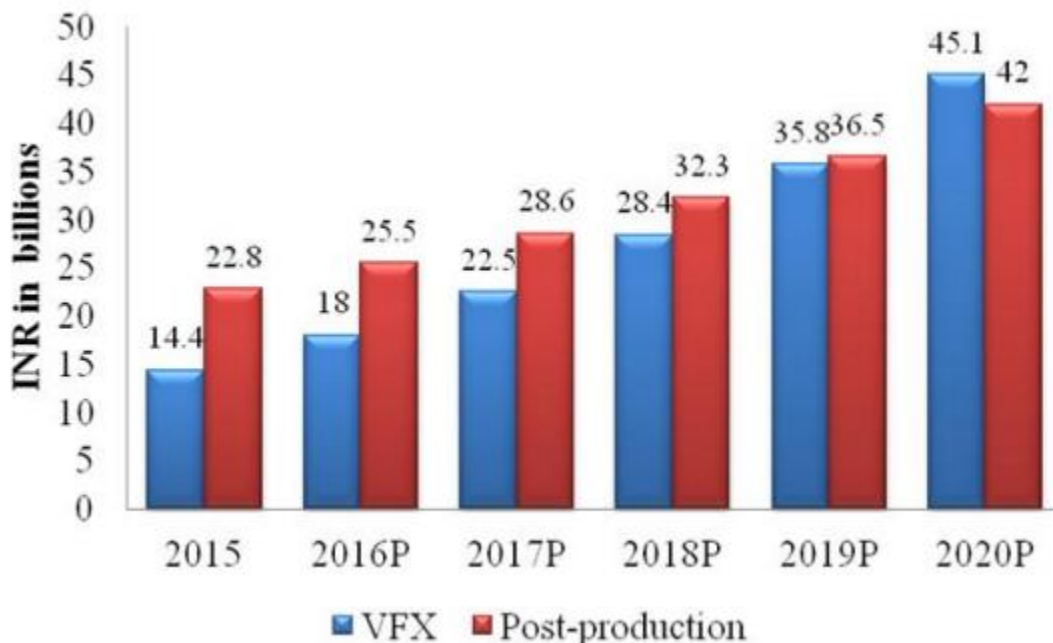
(Source: KPMG in India analysis and discussions, 2016)

**Table - 2**

The Indian Animation Industry :Projection							INR in billions
Segments	2015	2016P	2017P	2018P	2019P	2020P	CAGR% 2016-2020
<b>Animation services</b>	<b>8.3</b>	8.8	9.5	10.4	11.4	12.5	<b>8.6%</b>
<b>Animation production</b>	<b>5.6</b>	6.0	6.5	7.0	7.6	8.4	<b>8.4%</b>
<b>Total Animation</b>	<b>13.9</b>	<b>14.8</b>	<b>16</b>	<b>17.4</b>	<b>19</b>	<b>20.9</b>	<b>8.5%</b>

(Source: KPMG in India analysis and discussions,2016)

Chart - 2



(Source: KPMG in India analysis and discussions, 2016)

Table - 3

The Indian VFX and Post production Industry: Projection							INR in billions
Segments	2015	2016P	2017P	2018P	2019P	2020P	CAGR% 2016-2020
<b>VFX</b>	<b>14.4</b>	18	22.5	28.4	35.8	45.1	<b>25.6%</b>
<b>Post-production</b>	<b>22.8</b>	25.5	28.6	32.3	36.5	42	<b>13.0%</b>
<b>Total VFX and Post production</b>	<b>37.2</b>	<b>43.5</b>	<b>51.1</b>	<b>60.7</b>	<b>72.3</b>	<b>87.1</b>	<b>18.5%</b>

(Source: KPMG in India analysis and discussions,2016)

India’s animation studios are catering to the requirements of various end user segments such as feature films, TV programs, advertisements/commercials and computer games. Animation solutions are also finding a place in niches such as film titling, special effects, Web entertainment programs, TV broadcast graphics, 3D modeling and background development. In each of these areas the extent or scopes of services for an animation production company include offering services in animation production services, co-production and content creation.

Segments such as online education, CAD/CAE, and industry specific applications such as architecture, medical, legal/insurance, etc. are also potential platforms for animation, though Indian studios are not focused on these markets. Skill sets in 2D and 3D animation are leading to opportunities in segments such as TV programs and feature films. The Indian domestic market too is throwing up revenue generation prospects for ICT solutions providers specializing in this market. The requirement by the burgeoning Indian television segment for animation and special effects related

work is also giving a fillip to this segment. Recognizing this potential, a number of Indian software players are turning their attention to animation. Animation studios now dot the country and the industry is also witnessing the arrival of training houses that are dedicated to building skilled manpower for this market.

### RESOURCES IN POLYTECHNICS

Presently, there are 3850 polytechnics under the aegis of the Ministry of Human Resource Development with a capacity of over 12,55,000 offering three-year diploma programmes in various branches of engineering with an entry qualification of the 10<sup>th</sup> pass. The proportion of polytechnics is high in the southern states (37.8%).

(Source:<http://www.aicte-india.org/dashboard/pages/dashboardaicte.php>)

Further, the proportion of public sector institutions at degree level in the country is very low around 9 per cent and on the other hand around 30 per cent of diploma level institutions are in public sector. There are 1455 polytechnics in the southern

region of the country followed by 1382 polytechnics in the northern region. The eastern and north eastern region combine together has 373 polytechnic institutions and the western region has 636 polytechnics.

(Source: <http://www.aicte-india.org/dashboard/pages/dashboardaicte.php>)

Most of the Polytechnics in the country offer three year generalized diploma programmes in conventional subjects such as civil, electrical and mechanical engineering. The programmes are now diversified to include electronics, computer science, medical lab technology and hospital engineering. Women's Polytechnics further offer programmes in garment technology, beauty culture, textile design and library science.

### **QUALIFIED FACULTY, RESOURCES AND INFRASTRUCTURE**

Many of the polytechnics in the country have been established about 50 years ago and the infrastructure facilities in terms of buildings and equipment provided at that time continue to be used in the polytechnics. Changes in technology and field practices call for corresponding changes in equipment and laboratory facilities. Due to resource constraints, most of the facilities have not been updated adequately. The Government of India has been providing grants under Direct Central Assistance to keep the polytechnics updated. The World Bank Assisted projects modernized the facilities, resources and programmes of polytechnics. The instructional strategy employed in the polytechnics is predominately classroom-based teaching. Laboratory practices are conducted as per requirements in specific curriculum. Many of the polytechnics have acquired adequate audio-visual hardware through special schemes of the central government or under World Bank assisted project. However, the faculties have to be trained to implement the new courses in Animation Engineering. In addition, the books in Animation Engineering and licensed software have to be procured along with the free open source software. The existing faculty of Computer Science and Engineering could be trained to meet the needs of the Animation Engineering.

### **EXISTING DIPLOMA PROGRAMME IN COMPUTER SCIENCE AND ENGINEERING**

Computer Science is an interdisciplinary field, both in its origin and application. Whether the goal is to become a practicing computer engineer or to take a few courses to develop a basic understanding of computer skills for application in other fields, the diploma in Computer Science is committed to helping in gaining the computer knowledge. The polytechnic colleges in India produce around 2,70,000 diploma holders in computer science and engineering every year.

(Source: <http://www.aicte-india.org/dashboard/pages/dashboardaicte.php>)

A large number of diploma holders in Computer Science and Engineering do not get proper jobs. Also the fast growing animation industry needs entry level technicians with adequate knowledge and skills in animation related areas.

### **PROPOSED DIPLOMA PROGRAMME IN ANIMATION ENGINEERING**

There are nearly well-qualified 24,000 teachers in polytechnics in India. The infrastructure, expertise teachers and student population is a great source of strength to start the diploma in animation engineering in the polytechnic colleges.

(Source: <http://www.aicte-india.org/dashboard/pages/dashboardaicte.php>)

Computer Science is an interdisciplinary field, both in its origin and application. Computer Science plays an important role in virtually all fields, including science, medicine, music, arts, business, law, and communication. Whether the goal is to become a practicing computer engineer or to take a few courses to develop a basic understanding of computer skills for application in other fields, the diploma in Computer Science is committed to helping in gaining the computer knowledge. The students who choose the animation as the career can undergo the diploma programme in computer animation engineering.

### **JOB OPPORTUNITIES FOR DIPLOMA HOLDERS IN CAE**

On completion of Diploma in Computer Animation Engineering(CAE), plenty of career opportunities exist in the Animation industry like Modeling artist, Lighting artist, Render artist, Character animator, Layout artist, Digital sculptor, Rigging artist, FX artist, Rotoscopy & cleanup artist, Match moving artist, Video editor, Motion graphics artist, Composer, Texturing artist, 3D Generalist, Design visualization artist, Animator, Digital designer, Game designer, Composer, Revisualization artist, Motion graphics artist, Graphic designer, Packaging designer,, Advertising art director, Web designer, User interface designer, Illustrator, Magazine layout designer etc. They can also find openings in film Industry, Television, Advertisement Industry, Web designing, e-publishing, Print media etc. Infinite opportunities in the field of web and multimedia designing are available for computer animation diploma holders. Most Multi National Companies (MNCs) prefer diploma students for business process outsourcing (BPO) and Call Centre jobs. (Source: <http://www.animationcareerreview.com/careers-animation/types-jobs>)

A Diploma in Computer Animation can also prepare the students for a wide range of careers such in

- Computer Industry,
- Entertainment Industry ,
- Film &Television,
- Digital and Print Media and
- Graphic Design and Art.

Today India is an emerging player in the field of Animation engineering. The ever growing demand for trained computer animation professionals is increasing. After successful completion of Diploma in Computer Animation Engineering, a candidate can seek jobs in the media and entertainment (M&E) Industry, which is the sunrise sector in the emerging Indian economics.

However a large number of candidates who completed short term animation courses with high cost unable to get proper jobs due to non-standard curriculum. Hence, the fast growing animation industry needs entry level technicians with adequate knowledge and skills.

### **PROGRAMME EDUCATIONAL OBJECTIVES FOR DIPLOMA IN ANIMATION ENGINEERING**

This programme prepares the students in carving a career in various sectors of the media. The programme aims to offer the students a concrete ground for developing good communication skills. The programme also nurtures the creative skills of the students. It is considered as one of the most sought after and an ambitious programmes. The quality learning experience is combined with a “low cost to students / high expectations” philosophy. This ideally positions enrich the student for entry into the animation industry. It promotes an atmosphere of creative freedom which is balanced by delivery of real-world transferable skills and an attitude of quality through effort supported by quality hardwares.

### **PLANNED PROGRAMME OUTCOMES**

This programme would provide students with the skills and knowledge required for employment or further training in digital media. The theoretical and practical skills taught in this programme would reflect the diverse range of skills required to work in the animation industry. The Animation Diploma at polytechnic college would offer the opportunity to work with some of the most advanced digital software in the market which would lead to animation graduates winning places in the leading animation studios across the world.

### **RETENTION OF COURSES IN COMPUTER SCIENCE AND ENGINEERING AND SET OF NEW COURSES FOR THE PROPOSED COMPUTER ANIMATION ENGINEERING**

The three year diploma programmes are conducted by DOTE (Directorate of technical education) and approved by the AICTE should possess the basic engineering courses in the first two semesters irrespective of the disciplines and moreover these courses are very fundamental and foundation in nature for all the programmes of the engineering diploma. Hence, as the proposed programme Diploma in Computer Animation Engineering is also engineering in nature, obviously the first year courses are retained. Proposed set of new courses for the Diploma in Computer Animation Engineering are mentioned here,

## **Diploma in Computer Animation Engineering compared to Computer Engineering Offered in DOTE, Tamil Nadu, India**

**(I YEAR – Basic Engineering Programme is Common for all the discipline)**

**Table - 4**

<b>III Semester</b>				
<b>S.No</b>	<b>Course Code</b>	<b>Computer Animation Engineering courses</b>	<b>Computer Engineering courses retained for Computer Animation Engineering</b>	<b>Remarks</b>
1.	36231	FUNDAMENTAL OF CREATIVE ART DESIGN AND VISUALIZATION TECHNIQUES		New course
2.	36232	OPERATING SYSTEM	Retained	
3.	36233	2D ANIMATION		New course
4.	36234	ANIMATION PREPRODUCTION PROCESS		New course
5.	36235	OPERATING SYSTEM PRACTICAL	Retained	
6.	36236	2D ANIMATION PRACTICAL		New course
7.	36237	ANIMATION PREPRODUCTION PROCESS PRACTICAL		New course

**IV Semester**

<b>S.No</b>	<b>Course Code</b>	<b>Computer Animation Engineering courses</b>	<b>Computer Engineering courses retained for Computer Animation Engineering</b>	<b>Remarks</b>
1.	36241	MULTIMEDIA SYSTEM	Retained	Course content has been modified as per the requirement of CAE Course
2.	36242	ANIMATION PRODUCTION PROCESS		New course
3.	36243	OBJECT ORIENTED PROGRAMMING WITH JAVA	Retained	
4.	36244	MULTIMEDIA SYSTEM PRACTICAL	Retained	Course content has been modified as per the requirement of CAE Course
5.	36245	ANIMATION PRODUCTION PROCESS PRACTICAL		New course
6.	36246	OBJECT ORIENTED PROGRAMMING WITH JAVA PRACTICAL	Retained	
7.	30001	LIFE AND EMPLOYABILITY SKILL PRACTICAL	Retained	Common for all Discipline

**V Semester**

<b>S.No</b>	<b>Course Code</b>	<b>Computer Animation Engineering courses</b>	<b>Computer Engineering courses retained for Computer Animation Engineering</b>	<b>Remarks</b>
1.	36251	3ds Max		New course
2.	36252	GAME DESIGNING		New course
3.	36253	ANIMATION POST PRODUCTION PROCESS		New course
<u>Elective – I Theory</u>				
4.	36271	WEB DESIGNING	Retained	
	36272	VFX		New course
5.	36255	3ds Max PRACTICAL		New course
6.	36256	GAME DESIGNING PRACTICAL		New course
7.	36257	ANIMATION POST PRODUCTION PROCESS PRACTICAL		New course

**VI Semester**

S.No	Course Code	Computer Animation Engineering courses	Computer Engineering courses retained for Computer Animation Engineering	Remarks
1.	36261	MAYA		New course
2.	36262	COMPUTER HARDWARE Elective – II Theory	Retained	
3.	36281	DIGITAL CINEMATOGRAPHY		New course
	36282	OPEN SOURCE SOFTWARE	Retained	Course content has been modified as per the requirement of CAE Course
4.	36264	MAYA PRACTICAL		New course
5.	36265	COMPUTER HARDWARE PRACTICAL Elective – II Practical	Retained	
6.	36283	DIGITAL CINEMATOGRAPHY PRACTICAL		New course
	36284	OPEN SOURCE SOFTWARE PRACTICAL	Retained	Course content has been modified as per the requirement of CAE Course
7.	36267	PROJECT WORK	Retained	-

**DESIRED COURSE OUTCOMES**

The desired course outcome is to develop high skilled and knowledgeable animation technician to cater the demand of the emerging animation industry. So the diplomads can get enormous opportunities in the job market and they can do startup in the animation Industry.

**OPTIMIZATION OF AVAILABLE RESOURCES**

In keeping with the polytechnic education philosophy, students would be provided all facilities to participate actively in several co-curricular and extra- curricular activities. The polytechnic colleges have developed excellent facilities and resources such as spacious classrooms, seminar halls, well

equipped laboratories, workshops, well stocked libraries and well qualified faculty. The colleges have laid emphasis on guest lectures, educational tours and continuous interaction with industries right from its inception of course in animation engineering.

Academic core philosophy is rooted in the belief that polytechnic education, beyond knowledge must point the way to self -fulfillment through the development of the entire personality. By optimizing their potential and providing them direction through a cohesive training programme, the polytechnic team will empower each student to successfully confront and overcome the formidable competition that awaits them in the global market place



**OPEN SOURCE SOFTWARE**

The following are some of the Open Source Software available,

**Table – 5 List of Open Source Software for the proposed Computer Animation Diploma programme**

S.No	Computer Animation Engineering Courses	Open Source Software
1	Multimedia System Practical	2D Animation: Pencil2D, Pivot Animator, Synfig, Tupi(Formerly Ktoon), 3d Animation: Art Of Illusion, Blender, K-3d,Openfx, Seamless3d Flash animation: <u>Pencil Animation</u> (for animations), <u>SWFTools</u> (for scripting) Image viewers: Eye of GNOME, F-spot, Geeqie, Gthumb, Gwenview, Kphotoalbum, Opticks
2	2D Animation Practical	Pencil, <b>Synfig Studios</b> , Stykz, Creatoon Ajax Animator, Blender, Bryce, DAZ Studio Clara.io,Art Of Illusion,K-3d,Openfx, Seamless3d,KToon
3	Animation Preproduction Process Practical	Celtx — Media Pre-production Software,Gnome Subtitles
4	Animation Production Process Practical	Modeling : Blender,,3D CAD,3D Modelio, StarUML, ART of illusion VFX : Natron ,Gaffer Lighting :Radiance Rendering: Art of illusion, appleseed , Aqsis , cycles , Fujiyama, GuerillaRender, LuxRender, MitsubaRender, NOX, pbrt, Pixie, POV-Ray, Radiance, Sunflow, YafRay
5	Object Oriented Programming With Java Practical	Java is Open Source Software. It is Platform independent.
6	Web Designing	<u>Apache Cocoon</u> — a web application framework <u>Apache</u> — the most popular web server <u>AWStats</u> — a log file parser and analyzer <u>BookmarkSync</u> — a tool for browsers <u>Cherokee</u> — Speedy, feature rich HTTP Server <u>curl-loader</u> — a powerful HTTP/HTTPS/ FTP/ FTPS loading and testing open-source tool <u>Hiawatha</u> — Secure, high performance and easy-to-configure HTTP server <u>HTTP File Server</u> — a user friendly file server software with a drag and drop interface <u>lighttpd</u> — Resource sparing but also fast and full featured HTTP Server <u>Lucee</u> — CFML Application Server <u>nginx</u> — lightweight, high performance web server/reverse proxy and e-mail (IMAP/POP3) proxy <u>NetKernel</u> — an internet application server <u>Piwik</u> — a web analytics system <u>Qcodo</u> — a PHP5 framework <u>Squid (software)</u> — web proxy cache <u>Vaadin</u> — a fast to use java based framework for creating web applications <u>Varnish (software)</u> — high-performance web application accelerator/reverse proxy and load balancer/HTTP router <u>XAMPP</u> — a package of web applications including Apache and MySQL <u>Zope</u> — a web application server
7	Vfx	Pitivi, OpenShot, Lightworks, Avidemux, Cinelerra, KDenlive, Blender, The winner

8	3d Animation Practical	Wings 3D, <u>Ayam</u> , DAZ Studio, <u>Art of Illusion</u> , <u>Blender</u> , <u>K-3D</u> , <u>OpenFX</u> , <u>Seamless3D</u>
9	Game Designing Practical	Unity 4, MonoGame, Turbulenz, Project Anarchy, Stencyl, PlayCanvas, Phaser, Gamesalad, Corona SDK, Renderdoc, Wwise, FMOD, WebAnimate, Upsight, Haxe
9	Animation Post Production Process Practical	Compositing software: MacOS X, Natron Motion Graphics: NodeBox Colorcorrection: Darktable Video converters: Dr. DivX, FFmpeg, MEncoder, OggConvert, Transcode Video editing: Avidemux, AviSynth, Blender, Cinelerra, DScaler, DVD Flick, Kaltura, Kdenlive, Kino, LiVES, OpenShot Video Editor, Pitivi, VirtualDub, VirtualDubMod, VideoLAN Movie Creator: VLMC is non-linear editing software for video creation based on libVLC and running on Windows, Linux and Mac OS X. Video encoders: Avidemux, HandBrake Video players: VLC, Media Player Classic

### VALIDATION OF THE DRAFT CURRICULUM IN COMPUTER ANIMATION ENGINEERING

The draft curriculum has been presented to a group of four engineers who are working in the Animation Engineering in Chennai.

Their feedbacks are:

- They felt that the faculty of Computer Science and Engineering are to be trained before the new programme is implemented.
- If there is a need, enough hardware is to be purchased.
- The required open source software to be downloaded and the faculty have to be trained in using them.
- The feedbacks from the students and the faculties have to be obtained at the end of each semester.
- Improvements have to be effected.

### TRAINING TO THE FACULTY

Changes in technology and field practices call for corresponding changes in equipment, laboratory facilities, course content and the up gradation of the faculty. The faculty of Computer Science & Engineering can able to teach the courses which are retained in the new programme. But, it has been identified that the faculty in the Computer Science and Engineering programme have to be trained for the proposed new courses in the Computer Animation Engineering diploma programme as mentioned in the table 4.

The curriculum development activity has contributed to the adoption of systematic approaches to the development of job-related technical programmes with the involvement of teachers from polytechnics and other technical institutions, as well as professionals from industry.

### MARKET DRIVEN PROJECTS

The Diploma in animation engineering is designed to enable students to excel in animation field through a strong foundation in the basics of designing, creating and publishing interactive animation products. This programme also provides a comprehensive education in animation, software skills and project expertise required in the animation industry. By using programming tools and the latest software, students will be

able to create market-driven animation programmes and consider critical business elements in their animation design and development projects. This programme will give students a holistic approach to an enriching learning experience. Assessments will be conducted via coursework as well as paper examinations so that students are well-versed in the required skill-sets through realistic coursework and practical and market driven programming projects.

### NETWORKING WITH THE GOVERNMENT AND PRIVATE INDUSTRIES

The polytechnic colleges should be linked with both Central and State Governments and also various Government departments for the purpose of getting development projects, product and programme developments and financial support for animation engineering. Besides, the polytechnic colleges should be connected with the private animation industries in order to understand the industrial expectations in animation curricula, skills requirements, industrial projects for both colleges and students, trainings and students' recruitments.

### INDUSTRY-INSTITUTE PARTNERSHIP

The Relationship between the Industry and the Institutes has to be established to identify the industrial requirements and to prepare the institutes to meet the industrial needs by facilitating the sponsored Research & Development projects, workshops, seminars and training programmes. This cooperation initiates the institute to equip their faculty to adopt the latest practices so as to make their students equip for the dynamically changing industrial trends by honing their skill set accordingly.

The Primary objective of the Industry and the Institute partnership is to bridge the gap of the industries needs and to produce the qualified, skilled human resources to achieve the optimum economic results. This can be achieved by the active participation of the Industries along with the academic experts. The consortium will provide the opportunity to all the stake holders: Institutions, Industry, Students and the Society for the mutual benefits.

## **BENEFITS TO THE STUDENTS AND THE INDUSTRY**

The proposed new diploma programme will make the positive impact in the life of the students. In general, the students who choose the diploma programme are belonging to the middle income and lower middle income group and they are unaffordable to undergo the short term courses of Computer Animation which are conducted by the private sector institutes. The major benefits to the students are the fulltime Quality education organized by the government Institutes with the minimal cost, where as in the private sector institutes cost the students around US\$3000 per annum for the short term courses.

(Resource: From different private Animation training Institutes in India)

The consortium of the Industry and Institute will provide the opportunity to the students for the project training. The qualified and successful out comers will get the job opportunities in the Animation sector, which is the fastest growing sector in the emerging markets like India. On the other hand, the Animation Industry will be the beneficiaries by utilizing the organized, qualified and trained manpower for their projects, as the scarcity of the technical workforce is persist in the industry, not only in India but worldwide.

## **PROGRAMME ADVISORY COMMITTEE**

It is suggested to establish a Programme Advisory Committee for Computer Animation Engineering. The programme advisory committee is to engage members of the wider community who have an informed interest in an animation engineering area within the polytechnic. The main role of the committees is to provide advice on the quality, relevance, scope and currency of animation engineering, and to advise on training and education priorities and gaps. It will contribute to ongoing self assessments and internal evaluations. The programme advisory committee should consist of a minimum of six external members. Normally members would serve a three year term.

The principal of polytechnic college, or equivalent, or a delegate, shall attend all programme advisory committee meetings, and is responsible for ensuring meetings are appropriately resourced and serviced. The principal of polytechnic college can call on specific individuals from time to time if necessary to provide particular information for the programme advisory committee. Besides, there should be a student representative for programme advisory committee. All members are honorary appointments.

## **CONTINUOUS PROCESS IMPROVEMENT**

The diploma in animation engineering should continuously improve the standard of living and to react to changing needs of expertise and skills. This programme aims to improve the international compatibility and more functional. The development discussions concerning the diploma in animation engineering have centered round curriculum design as well as teaching and learning activities, all aiming at producing new expertise for professional life. Evaluation is a central tool in the development of diploma in animation

engineering, as through evaluation it is possible to obtain necessary information for directing and improving the all its activities.

## **FEEDBACK AT THE END OF THE COURSES AND EXIT INTERVIEWS**

The cornerstone of development activities is, however, continuous internal feedback and self-assessment, the results of which can be utilized both quickly and efficiently. Systematic and continuous self-assessment provides polytechnic colleges with means to improve their operating strategies as well as to define their position in the market. The feedback should be collected from the students, parents, staff and industrial units in order to improve the quality of diploma in animation engineering education. Besides, the feed should also be collected from the alumni students. The collected feedback should be critically analyzed and the strategies should be formulated and implemented in order to achieve the requirements of all the stakeholders of animation engineering.

## **SUMMARY AND CONCLUSIONS**

The animation industry operates across many sectors of the creative industries including TV, film, advertising, new media, and computer and video games. At the core of it, nonetheless, exists animation for TV and cinema: it not only has a strong identity as an art form and consumer product but also functions as an important source of inspiration and development both aesthetic and technological for other forms of animation. TV animation and animated film are costly to make but have a long history of commercialization and merchandisation. Easy dubbing and less embeddedness in a local cultural context imply their potential to be a highly profitable property travelling across linguistic and cultural borders.

Like other creative industries, the animation industry relies on a young creative workforce that finds great affinity between work, pleasure and personal identity. In terms of earning, job security, working conditions and social security, however, the challenges facing them seem not dissimilar to other creative works. Therefore, it is necessary to develop a senate diploma programme in animation engineering as a part of polytechnic education in order to tap the huge market potential of animation industry in near future.

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