

**RAMCO INSTITUTE OF TECHNOLOGY**  
**Department of Electronics and Communication Engineering**  
**Academic Year: 2019- 2020 (Odd Semester)**

**Innovative Practices Description**

**Degree, Semester & Branch: VII Semester B.E. ECE A**

**Course Code & Title: EC6004 Satellite Communication**

**Name of the Faculty member: Mr.P.Venkatesh**

**Name of the Topic: Launch procedures, Launch vehicles and propulsion**

**Name of the Innovative Practice: Animated Video**

**Date & Duration: 31.07.2019 & 10 minutes**

**ICT Tool Used: LCD Projector**

**Description:**

**Animated Video:**

Animated video is an engaging tool that can help us to understand the concept more comprehensively. 65% of people are visual learners, and 90% of the information transmitted to the brain is visual. Vision is our most dominant sense, taking up half of our brain's resources. And visual information is processed more faster than text.

**Goals (Learning Outcomes):**

The students will be able to

- i) Understand the launch procedure used in current satellite communication due to the valuable inputs that were gained from the video
- ii) They were also able to differentiate the procedures used in launching.

**Use of appropriate method:**

**Justification for choosing the topic using Animated Video:**

Launch procedure describes satellite launch procedure. It mentions various steps or procedure followed in order to launch satellite in its parking space. Launching of satellite into the space is a topic requiring imaginary thinking and may be tedious to visualize. Launching also happens in various orbits of the earth and also in other planets. Hence it would be better to project the topic with an effective video that shows how the satellites are being launched with its types of vehicles.

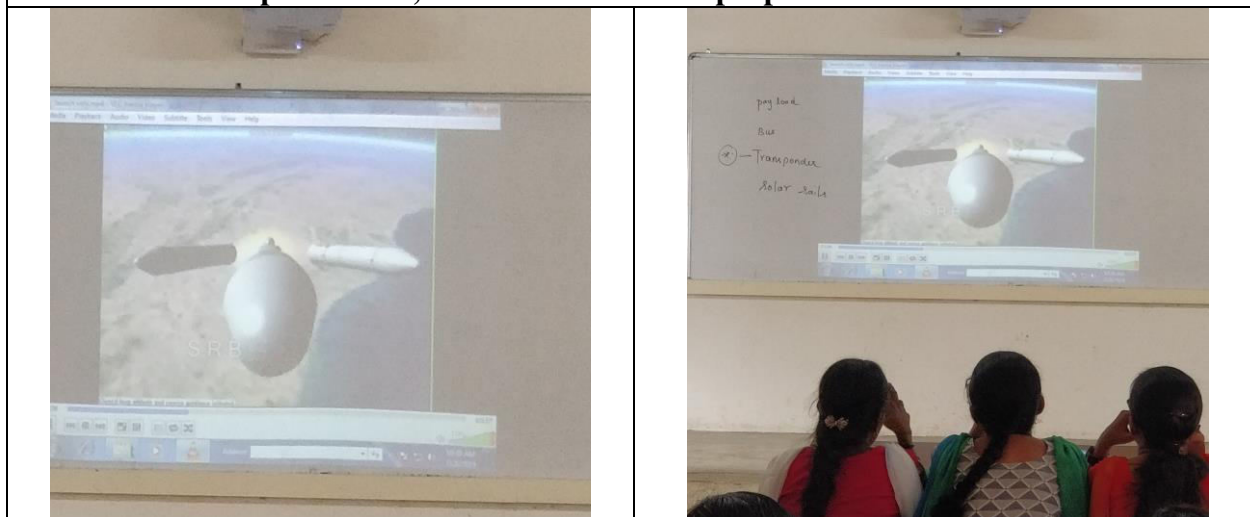
**Effective presentation:**

**Implementation (Plan & Execution) with Proof:**

The activity being a video activity, the planning time and execution time of the activity was the running time of the video. However during the video certain explanations were given which took additional 2 to 3 minutes. The video was played using the LCD projector available in the class room.

## Innovative Teaching Method Execution

### Launch procedures, Launch vehicles and propulsion - Animated Video



#### **Significance of Results:**

#### **Assessment of Effectiveness/Success of the Activity:**

- This is a repeated topic asked in university questions.
- The effectiveness is when this topic was asked in the exam, more number of students attended and presented with visual exposure

#### **Reflective Critique:**

#### **Benefits:**

- i) The students felt easy to visualize the concepts in launching the satellites and explained the topic in a better way with practical concept.
- ii) How every part of the vehicle gets detached was also shown so that students understood the launch procedures.

#### **Challenges:**

- i) This video gives conceptual explanation but contents for exam point of view is not proper.
- ii) Certain terminologies were new to students which they felt hard to understand.

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	2	1						2

*CO1: The students will be able to determine the azimuth and elevation angles and visibility of a geostationary satellite from an earth station*

#### **References:**

1. <https://www.youtube.com/watch?v=lGoVy44C3cA>
2. <https://www.youtube.com/watch?v=8RJZ7yLCbrM>
3. [https://www.brainkart.com/article/Launch-vehicles-and-propulsion\\_11919/](https://www.brainkart.com/article/Launch-vehicles-and-propulsion_11919/)

**RAMCO INSTITUTE OF TECHNOLOGY**  
**Department of Electronics and Communication Engineering**  
**Academic Year: 2019- 2020 (Odd Semester)**

**Innovative Practices Description**

**UNIT II - Space Segment and Satellite Link Design**

**Degree, Semester & Branch: VII Semester B.E. ECE A**

**Course Code & Title: EC6004 Satellite Communication**

**Name of the Faculty member: Mr.P.Venkatesh**

**Name of the Topic: Link budget**

**Name of the Innovative Practice: One minute paper**

**Date & Duration: 31.07.2019 & 5 minutes**

**Description:**

**One minute paper:**

A “one-minute paper” may be defined as a very short, in-class writing activity (taking one-minute or less to complete) in response to an instructor-posed question, which prompts students to reflect on the day’s lesson and provides the instructor with useful feedback. Additionally, by asking students to add a question at the end, this assessment becomes an integrative task. Students must first organize their thinking to rank the major points and then decide upon a significant question

**Goals (Learning Outcomes):**

The students will be able to

1. Analyze and design various Satellite Links
2. Improve the quality of class discussion by writing briefly about a concept or issue before they begin discussing it.

**Use of appropriate methods:**

**Reason for choosing the topic using One minute paper:**

Link budget is a topic that involves many equations such as carrier to noise ratio, EIRP, Flux density, Back-off etc. As it may be confound, making it as a practice to write those equations is a healthy aspect to remind those equations. This is the importance of this activity related to the given topic.

**Effective presentation**

**Implementation (Plan & Execution) with Proof:**

The name of the activity clearly shows that the activity should be done for one minute. Students were asked to take a separate paper, recollect the equation used in Link budget and then write them in a separate paper. Then after one among the students were called and asked to share the points that they have written to all others. Others can cross check the points given by the students and verify their points. Finally an overall conclusion shall be given.

## Innovative Teaching Method Execution

### Link budget - One minute paper



#### Significance of Results:

#### Assessment of Effectiveness/Success of the Activity:

- I have found that this gives the more reflective students a chance to gather their thoughts prior to verbalizing them.
- Students were able realize small mistakes that they commit while writing equations

#### Reflective Critique:

#### Benefits:

- i) The students felt easy to remember the equations used in link budget and recollect the concepts and equations involved in the topic of link budget during examination.
- ii) They were able to realize the point of small mistakes that they may commit while using the equations.

#### Challenges:

- i) Some of the students highly hesitated to come forward to share the points which they wrote.
- ii) There was a time lapse as students took some more time to recollect the equations

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO2	2	3	1	1				1		2	1	2

*CO2: The students will be able to explain the concept of signal propagation of space segment components and create link budgets for an uplink and a downlink*

#### References:

1. Text Book: Dennis Roddy, "Satellite Communication", 4<sup>th</sup> Edition, Mc Graw Hill International, 2006
2. <https://oncourseworkshop.com/self-awareness/one-minute-paper/>

**RAMCO INSTITUTE OF TECHNOLOGY**  
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**Innovative Practices Description**

**UNIT III - Earth Segment**

**Degree, Semester & Branch: VII Semester B.E. ECE A**  
**Course Code & Title: EC6004 Satellite Communication**  
**Name of the Faculty member: Mr.P.Venkatesh**  
**Name of the Topic: Transmission Losses**  
**Name of the Innovative Practice: Think-pair-share**  
**Date & Duration: 22.08.2019 & 15 minutes**

**Description:**

**Think-pair-share:**

Think-pair-share (TPS) is a collaborative learning strategy where students work together to solve a problem or answer a question about an assigned reading. This strategy requires students to (1) Think individually about a topic or answer to a question; (2) Combine comparing (pair) the ideas and (3) Share ideas with classmates. Discussing with a partner maximizes participation, focuses attention and engages students in comprehending the reading material.

**Goals (Learning Outcomes):**

The students will be able to

1. Distinguish the types Transmission Losses.
2. Analyze and provide suitable remedies to overcome the effects of losses. .

**Use of appropriate methods:**

**Reason for choosing the topic using Think-pair-share:**

Satellite Communication involves various concepts of losses as it has a large distance between the satellite and Earth station. Such losses may be inexplicit to understand and to remember. This activity enables them to list the losses and its types without any confusion.

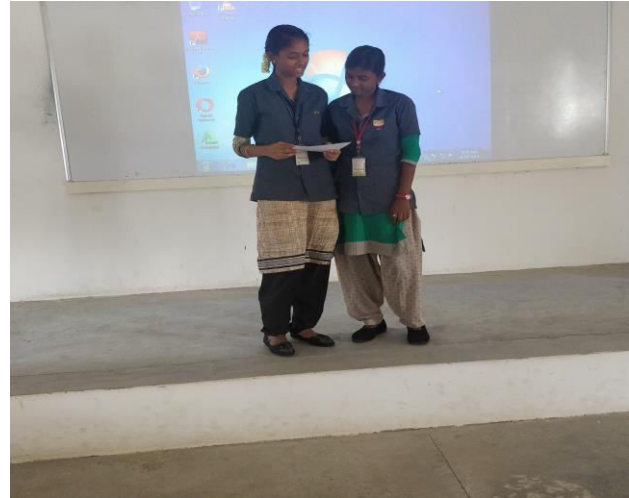
**Effective presentation:**

**Implementation (Plan & Execution) with Proof:**

The activity was planned for duration of 15 minutes. First the students were asked to think about the topic given. Then they were paired among their nearby students. They should then share the ideas that they have recollected and list it down in a paper. Later some among the students (pair) were asked to come front and share their ideas that they have written with the entire class.

**Innovative Teaching Method Execution**

**Transmission Losses - Think-pair-share**



**Significance of Results:**

**Assessment of Effectiveness/Success of the Activity:**

This strategy in developing critical thinking skills among the students. Think Pair Share is one of the learning strategies that encourages student to participate in group discussion

**Reflective Critique:**

**Benefits:**

- i) The personal interaction motivates students who might not generally be interested in the discipline.
- ii) It engages the entire class and allows quiet students to answer questions without having to stand out from their classmates.
- iii) Recollection of ideas will be easier as they are combined as pairs

**Challenges:**

- i) One of the biggest challenges of the think-pair-share is to get all students to truly be engaged.
- ii) That is students among different pairs may share the same ideas. In such case instructor may ensure the genuineness.

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO3	2	2		1		1	1	2	2	1		

*CO3: The students will be able to analyze the effect of rain attenuation in a satellite link and the availability of the link based on geographic location of the earth terminals*

## References:

1. Text Book: Dennis Roddy, “Satellite Communication”, 4<sup>th</sup> Edition, Mc Graw Hill International, 2006.
2. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, “Satellite Communication Systems Engineering”, Prentice Hall/Pearson, 2007,
3. [www.et.iitb.ac.in](http://www.et.iitb.ac.in) › Resources › files › TPS
4. <http://repositori.uin-alauddin.ac.id/10753/1/The%20effectiveness%20of%20think-pair-share%20technique%20toward%20students%20ability%20in%20writing%20descriptive%20text%20at%20The%20Eighth%20Grade%20Students%20of%20SMP%20Negeri%203%20Sinjai.pdf>

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**Innovative Practices Description**

**UNIT IV - Satellite Access**

**Degree, Semester & Branch: VII Semester B.E. ECE A**  
**Course Code & Title: EC6004 Satellite Communication**  
**Name of the Faculty member: Mr.P.Venkatesh**  
**Name of the Topic: Revision**  
**Name of the Innovative Practice: Mind Map**  
**Date & Duration: 26.09.2019 & 15 minutes**

**Description:**

**Mind Map:**

Mind mapping — a visual representation of information — is a versatile tool that can assist students with many aspects of their learning. It can help them map out new ideas, explore concepts in more detail and facilitate a better understanding of relationships and connections.

**Goals (Learning Outcomes):**

The students will be able to

1. Distinguish the types of multiple access.
2. Design satellite communication system using analog or digital modulation technique.
3. Analyze the various methods of satellite access

**Use of appropriate methods:**

**Reason for choosing the activity:**

This unit deals with the various access techniques such as single access and multiple access. Among multiple access again we have further classification such as FDMA, TDMA and CDMA. So students should be able to properly differentiate these types of access techniques used in satellite and wireless communication.

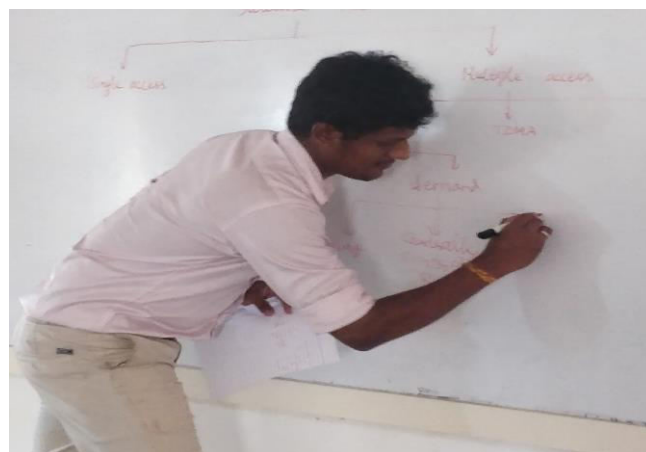
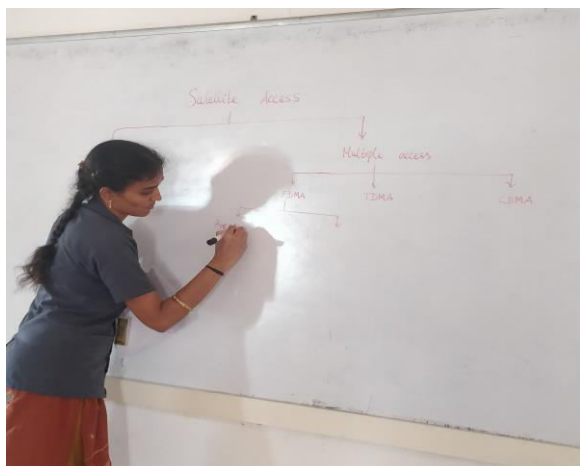
**Effective presentation:**

**Implementation (Plan & Execution) with Proof:**

The activity was planned for duration of 15 minutes. Initially the students were asked to write down the concepts for their reference. They need to map the various topics in the unit according to the concepts. They should then come and map the concepts and ideas in the class board. During this, they should also give a small oration about the concepts that they had understood. Students can add images and links to their mind maps, making it easier for them to collect all of their notes and sources in one place.

## Innovative Teaching Method Execution

### Revision - Mind Map



#### Significance of Results:

#### Assessment of Effectiveness/Success of the Activity:

On account of conducting this activity, the students were able to properly classify the various multiple access techniques. They also felt easier to remember the concept wise classification

#### Reflective Critique:

#### Benefits:

- i) The students felt easy to understand and classify the various types of access techniques according to the concepts.
- ii) As they were able to classify them, they felt easy to know the applications were these accessing techniques were used.

#### Challenges:

- i) The whole activity was shared among all the students where in some among them felt difficult to recollect the points because of which other students waited for a long time.
- ii) Also when the students were mapping the concepts in the board, some of the students fail to pay attention to them.

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO4	3	3		1		1	1	2	2	1		

*CO4: The Students will be able to design satellite communication system to carry voice, video and data signals using analog or digital modulation*

## **References:**

1. Text Book: Dennis Roddy, "Satellite Communication", 4th Edition, Mc Graw Hill International, 2006.
2. <https://www.mindmeister.com/blog/teach-mind-mapping/>

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**Innovative Practices Description**

**UNIT V - Satellite Applications**

**Degree, Semester & Branch: VII Semester B.E. ECE A**  
**Course Code & Title: EC6004 Satellite Communication**  
**Name of the Faculty member: Mr.P.Venkatesh**  
**Name of the Topic: Direct Broadcast Satellite**  
**Name of the Innovative Practice: Multi-media Clip**  
**Date & Duration: 04.10.2019 & 10 minutes**  
**ICT Tool Used: Animated video and LCD Projectors**

**Description:**

**Video Clip:**

Video clips are short clips of video, usually part of a longer recording. The term is also more loosely used to mean any short video less than the length of a traditional television program. While some video clips are taken from established media sources, community or individual produced clips are becoming more common.

**Goals (Learning Outcomes):**

Students will be able to

- i) visualize the integrated parts of the satellite broadcast system. So they can apply the concepts of various broadcast methods used in satellite communication.
- ii) relate the concept of multiple access used in satellite broadcast technologies.

**Use of appropriate methods:**

**Reason for choosing the topic using Video Clip:**

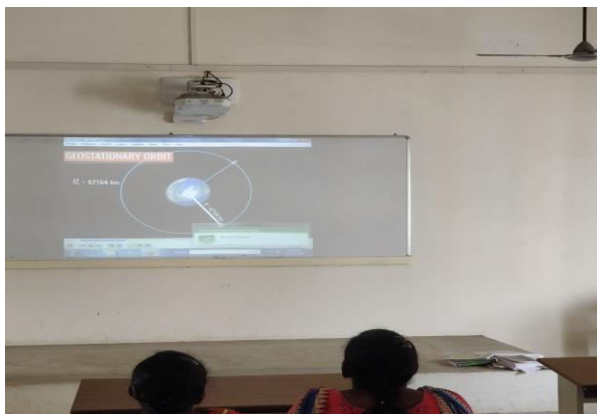
Satellite broadcast is accomplished with latest and advanced technologies. Understanding the process and functionality may be difficult with the contents in the book. A clear and appropriate video related to satellite broadcast shall help the students to understand the topic in a better manner.

**Effective presentation:**

**Implementation (Plan & Execution) with Proof:**

The activity being a video activity, the planning time and execution time of the activity was the running time of the video. However during the video certain explanations were given which took additional 2 to 3 minutes. The video was played using the LCD projector available in the class room. After the video, students shall be asked questions with respect to the classroom teaching content and the video which they are liable to answer.

**Innovative Teaching Method Execution**  
**Direct Broadcast Satellite - Video Clip**



**Significance of Results:**

**Assessment of Effectiveness/Success of the Activity:**

- When this topic was asked as a question in the Internal Examination, more number of students gave the live description that they had watched in the video.

**Reflective Critique:**

**Benefits:**

- i) Video on how direct broadcast happens and what are all the challenges faced in it was played for considerable duration because of which most of the students came to know the visualized concept behind satellite broadcast.
- ii) Students felt easy to visualize the broadcast systems and technologies which is not available in the text book

**Challenges:**

- i) This video gives conceptual explanation but contents for exam point of view was not adequate.
- ii) Some students were not able to understand the certain language of the speech given in background

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO5	2	3	2	1				1		2	1	2

*CO5: The Students will be able to analyze the various types of satellite services according to its applications*

**References:**

1. <https://www.youtube.com/watch?v=TgeGYd3ujdo>
2. <https://www.c-span.org/video/?67126-1/direct-broadcast-satellite-service&desktop=>