Class – XII
Lesson Plan-1

Topic: Inverse Trigonometric Functions

Brief Description of the lesson:

After studying this lesson, students will be able to define inverse trigonometric functions, state the condition for the inverse of trigonometric functions to exist, define the principal value of inverse trigonometric functions, find domain and range of inverse trigonometric functions, state the properties of inverse trigonometric functions, and simplify expressions involving inverse trigonometric functions.

Objectives:
I - Specific Objectives:
To enable the students to:
S1 Basic concept of trigonometric functions along with graph for existence of bijective functions (**Knowledge/Recalling)**
S2 Restriction on domain and range (Principal Value Branch) **(Understand/Classifying)**
S3 Inverse of all trigonometric functions and it properties **(Understand/Interpret)**
S4 Solution of problem based on substitution by a trigonometric function **(Synthesis/Producing)**

II - Behavioural Objectives:
By understanding and solving variety of problems, students will attain following behavioural objectives:
1) B1 To develop specific problem-solving approach required in the topic. **(Synthesis/Producing)**
2) B2 Develop the practical problem-solving skills by learning and applying different graphical representations. **(Apply/Implementation)**

Process / Activities:
1) ACT1 Students will plot the graph of inverse trigonometric function using trigonometric function and line y=x. **(Understand/Classifying)**

Skills:
1) Analysis
2) Problem solving
3) Application

Assessment:
Assessment of activity will be done based on decided rubrics:
A1 Assessment of activity will be done based on the following questions
(a) Plot the graphs of $y = \sin^{-1} x, \cos^{-1} x, \tan^{-1} x$.
(b) Plot the graphs of $y = \csc^{-1} x, \sec^{-1} x, \cot^{-1} x$.

Expected Learning Outcomes:
The students would be able to efficiently deal with:
1) Domain and range (Principal Value Branch) of Inverse trigonometric function

(Knowledge/Recalling)
2) Inverse of all trigonometric functions and it properties **(Understand/Classifying)**
3) Solution of problem based on substitution by a trigonometric function
(Understand/Interpret)
4) Critical thinking

Placements of Objectives, Instructional Activities and Assessment:

Topic/Start Date/Assessment					
Knowledge	Understanding	Application	Analysis	Synthesis	Evaluation
S1	S2			S4	
	S3	B2		B1	
	ACT1			A1	

REVIEW OF THE LESSON PLAN

(To be done when the lesson gets over)

Problems Faced:

1. Inverse trigonometric functions are the inverse of the trigonometric functions, but for few students they were difficult to understand because they require students to think about angles in a different way. For example, the sine function takes an angle as input and outputs a ratio, but the inverse sine function takes a ratio as input and outputs an angle.

2. A few students may have difficulty in remembering the different inverse trigonometric functions and their corresponding graphs. There are six inverse trigonometric functions, and each one has its own unique graph. Students can find it difficult to remember which function goes with which graph, and they may also have difficulty understanding how the graphs are related to the trigonometric functions.

Success: about 95% of the students understand the topic better and have ability to express it properly.

Failure: about 05% of students not be able to solve a particular set of questions, requiring a good understanding of graphs of inverse trigonometric functions.

Real Learning Outcomes: Students were able to

1. define the inverse sine function as the function that takes a ratio as input and outputs the angle whose sine is that ratio.

2. recognize the graphs of the six inverse trigonometric functions as follows $\sin^{-1} x, \cos^{-1} x, \tan^{-1} x, \csc^{-1} x, \sec^{-1} x, \cot^{-1} x$. Also students were able to evaluate domain and range of the functions.

3. solve both simple and complex equations involving inverse trigonometric functions. For example, students should be able to solve the equation sin x = 0.5 and the equation tan 2x = -1.

4. think critically and always remember that an inverse function is just an angle.

Students Response/Participation: Student's response to the chapter inverse trigonometric functions has been mixed, but generally positive. Some students find the topic to be challenging, but many others find it to be interesting and relevant to their further career.

Teacher's Learning: As the topic is more abstract and difficult to visualize, so teachers can analyse student work during classes or examinations to identify common misconceptions and areas where students are struggling. This information can help teachers to develop more effective teaching strategies. There are many formulas and identities which can be difficult to remember and apply. Teacher can devise/discuss easier way to learn the formulae.

To be incorporated in term 2: Repetitive class assessments of topics students are finding difficult to visualize/apply.