

**Advanced Manufacturing and Integrated Photonics Certificate Program (AMIP)**

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**Course module: Tools and Testing Equipment**

**Topic 2**

**Topic title: Oscilloscopes and Waveforms**

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**SAFETY NOTICE:** Safety should always be your top priority. While engaging in any actual or practical experiments or the implementation of any activity or exercise discussed or referenced in these course materials, be certain to learn about and take all necessary and appropriate safety precautions, including, without limitation, abiding by electrical, optical, and laser protocols and wearing any and all appropriate protective coverings and eye protection. Be advised that your engagement in any course, including any actual or practical experiments or the implementation of any activity or exercise discussed or referenced in these course materials, is entirely at your own risk. The authors and owners of these course materials hereby disclaim any and all liability with respect to your engagement in any course, including your participation in any actual or practical experiments or the implementation of any activity or exercise discussed or referenced in these course materials.

**Oscilloscopes and Waveforms**

**Goals:**

* **To understand the properties of waveforms**
* **To be able to operate an oscilloscope**
* **To be able to use the oscilloscope to measure wavelike signals**

1. **Videos & PowerPoints**
   1. Using an Oscilloscope – PowerPoint

[Operation of Oscilloscope.pptx](Operation%20of%20Oscilloscope.pptx)

* 1. How to use an oscilloscope – video
     1. <https://www.youtube.com/watch?v=u4zyptPLlJI>

1. **Online resources**
   1. Helpful videos on oscillation & waves:

<https://www.youtube.com/watch?v=VKtEzKcg6_s>

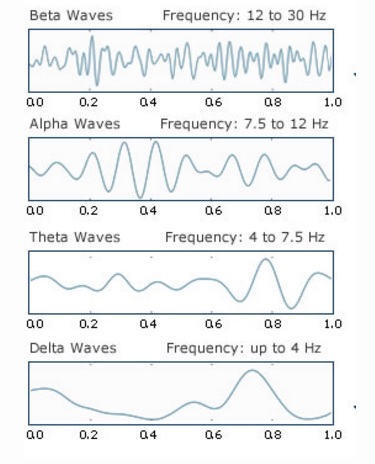
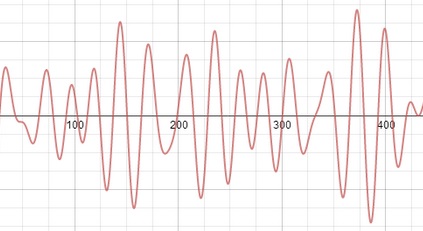
<https://www.youtube.com/watch?v=nFzu6CNtqec>

<https://en.wikipedia.org/wiki/Waveform#/media/File:Waveforms.svg>

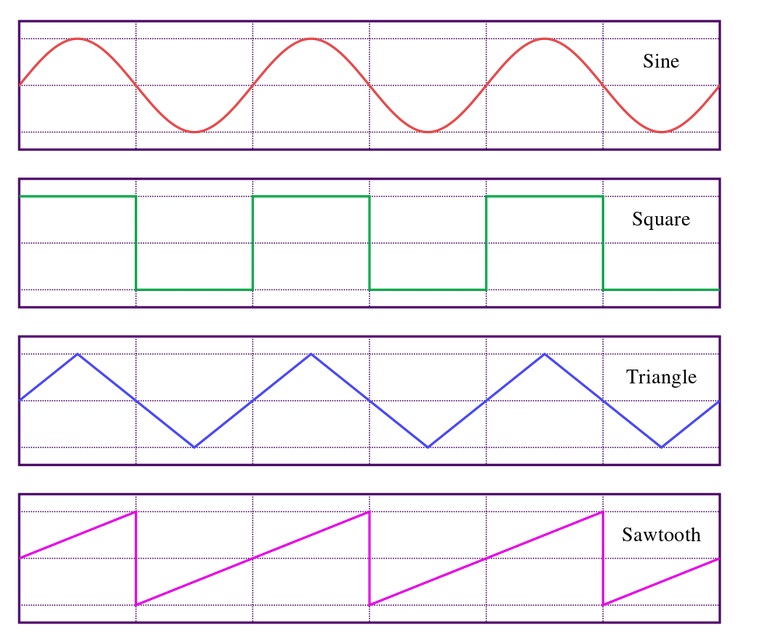
1. **Handouts**
   1. Hand out – sheets
      1. Examples of measuring the period of a wave

[Example measuring period.docx](Example%20measuring%20period.docx)

* + 1. Example of non-oscillating (non-periodic) signal



* + 1. Examples of oscillating (periodic) waves



1. **Projects, Discussions, and Written Assessment**
   1. Wave form assessment using oscilloscope to measure – amplitude

[Wave form assessment using oscilloscope - amplitude.docx](Wave%20form%20assessment%20using%20oscilloscope%20-%20amplitude.docx)

* 1. Wave form assessment using oscilloscope to measure – period

[Wave form assessment using oscilloscope - period.docx](Wave%20form%20assessment%20using%20oscilloscope%20-%20period.docx)

* 1. Wave form assessment using oscilloscope to calculate – frequency

[Wave form exam using oscilloscope - frequency.docx](Wave%20form%20exam%20using%20oscilloscope%20-%20frequency.docx)

* 1. Wave form assessment using oscilloscope to measure – amplitude, period & frequency

[Wave form assessment using oscilloscope - amplitude period & frequency.docx](Wave%20form%20assessment%20using%20oscilloscope%20-%20amplitude%20period%20&%20frequency.docx)

* 1. Identify the period of oscillating waveforms

[being able to identify the period of oscillating waveforms.docx](being%20able%20to%20identify%20the%20period%20of%20oscillating%20waveforms.docx)

1. **Supplies or equipment required:** 
   1. Oscilloscopes with probes,
   2. Function generator
   3. Alligator clips
   4. Bread boards
   5. Resistors
   6. 555 timer
   7. Capacitors
   8. LEDs