Lesson Plan 18

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| **Title**: **Chapter 16: Waves—I** | | **Ref. No**: Week 10,  Day 2 | | |
| **Target Group/Population**: B. Sc students (CS, EEE and IPE) | | **Duration**: 90 min | | |
| **Aims/Rationale**: To give the students basic concepts of wave speed on a stretched string, and energy and power of a wave traveling along a string | | | | |
| **Learning Outcomes**: At the end of the session, the students will be able to understand and analyze above topics and apply those to solve related problems. | | | | |
| **Contents:** 16-2: Wave speed on a stretched string (derivation from Newton’s second law) and 16-3: Energy and power of a wave traveling along a string | Method or  Technique | | Resource  or Aid | Time |
| **Introduction**:   * Welcome address * Rapport building * Review the main topics of last lecture * Importance/bridging the topic * Pre-assessment of student’s knowledge | Lecture QA | | WB  MMP | 15 min |
| **Development**:  1. Show that the speed of a transverse wave on a stretched string is , where *τ* is the tension on the string and *μ* is its mass per unit length.  2. The average power (average rate at which energy is transmitted) by a sinusoidal wave on a stretched string is  *Pavg = (1/2)µvω2ym2*. | Lecture  Discussion QA  Problem Solving | | WB  MMP | 60 min |
| **Conclusion**:   * Quick recap/summary * Feedback from the students * References * Forward planning |  | | WB  MMP | 15 min |
| Problems:  14. The equation of a transverse wave on a string is *y = (2.0 m) sin [(20 m-1)x - (600 s-1)t]*. The tension in the string is 15 N. (a) What is the wave speed? (b) Find the linear density of this string in grams per meter.  26. A string along which waves can travel is 2.70 m long and has a mass of 260 g. The tension in the string is 36.0 N. What must be the frequency of traveling waves of amplitude 7.70 mm for the average power to be 85.0 W? | | | | |