

Course outline

How does an NPTEL online course work?

Week 0

Week 1

- Introduction to optical sensors
- Different types of optical sensors
- Overview of distributed sensors
- Quiz : Assignment 1
- Optical Fiber Sensors : Week 1 Feedback Form
- Assignment 1 solutions

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

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Week 10

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Week 12

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# Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-02-03, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) Which of the following are the key benefits of using optical fiber sensors ? 1 point
- Immune to electromagnetic interference (EMI)
  - Sub-wavelength precision
  - Low attenuation
  - Easy availability of components
  - All of the above

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
All of the above

- 2) Mach-Zehnder interferometer is typically used in \_\_\_\_\_ modulated sensor 1 point
- Wavelength
  - Amplitude
  - Phase
  - Polarization

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Phase

- 3) Which of the following type of modulated sensors does not need further demodulation ? 1 point
- Wavelength
  - Amplitude
  - Phase
  - Polarization

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Amplitude

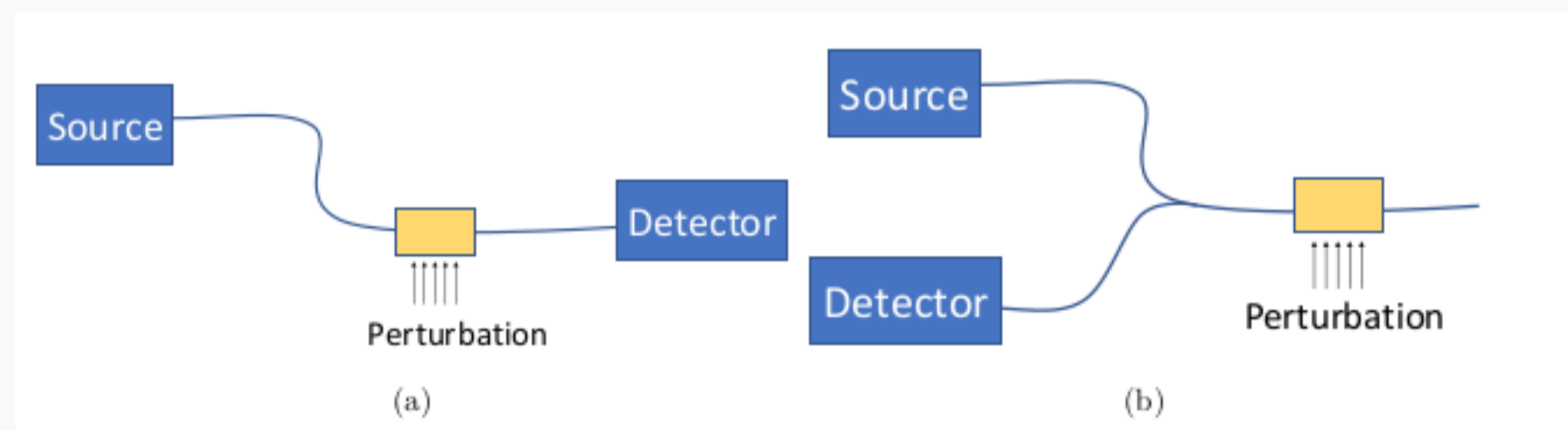
- 4) Electric field of an electromagnetic wave may be represented as  $a_x E_0 e^{j(\omega t - \beta z)}$ . Frequency is represented by 0.5 points
- $a_x$
  - $E_0$
  - $\omega$
  - $\beta$

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
 $\omega$

- 5) Electric field of an electromagnetic wave may be represented as  $a_x E_0 e^{j(\omega t - \beta z)}$ . Phase is represented by 0.5 points
- $a_x$
  - $E_0$
  - $\beta$
  - $\omega$

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
 $\beta$

- 6) Select the correct statement on typical optical fiber sensing configuration 1 point



- Fig (a) is the preferred sensing configuration because it detects more background light
- Fig (b) is the preferred sensing configuration because it detects lesser background light
- Both configurations (Fig (a) and Fig (b)) are good for sensing because forward and backward scattering are same.
- Both configurations (Fig (a) and Fig (b)) are good for sensing because background light is same.

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Fig (b) is the preferred sensing configuration because it detects lesser background light

- 7) \_\_\_\_\_ is the most desirable transduction mechanism since it is not easily corrupted. 1 point
- Intensity
  - Polarization
  - Wavelength
  - Phase

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Wavelength

- 8) Which is not a distributed sensing mechanism ? 1 point
- Raman-OTDR
  - Brillouin OTDA
  - Fiber Bragg gratings (FBG)
  - Phase-OTDR

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Fiber Bragg gratings (FBG)

A continuous 40 km long optical fiber link has a loss of 0.4 dB/km. Please answer the following with one decimal accuracy.

- 9) \_\_\_\_\_ dBm is the minimum optical power level that must be launched into the fiber to maintain an optical power level of  $2 \mu W$  at the receiving end 1.5 points

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
(Type: Range) -11.4,-10.4

- 10) \_\_\_\_\_ dBm is the input power that needs to be launched if the fiber has a loss of 0.6 dB/km and still maintain an optical power level of  $2 \mu W$  at the receiving end 1.5 points

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
(Type: Range) -3.4,-2.4