

## Tunable Laser Diodes

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### Course Description

This course will describe the state-of-the-art of tunable lasers, tunable laser technologies, control of tunable lasers and the commercial status. The course will include a brief introduction to semiconductor laser basics and also provide some background on DFB lasers, in particular how a grating works as a wavelength selective element in DFB and DBR lasers. The characteristics of these lasers will be discussed. Tuning mechanisms and tuning properties will be described, and the operation of modified structures with extended tuning range will be explained, including sampled gratings and super structure gratings. The properties of codirectional couplers and the use of these in tunable lasers will be discussed. Devices such as external cavity lasers, wavelength selectable lasers, tunable VCSELS and non-semiconductor alternatives, such as fiber lasers and waveguide lasers, will also be described. Throughout the course numerous examples of laser structures from the recent technical literature will be presented. Practical issues such as characterization, operation and control of tunable lasers, as well as switching speed and reliability, will be included.

### Benefits and Learning Objectives

This course should enable you to:

- Compare different tuning mechanisms.
- Discuss the working of lasers with wide tuning range.
- Compare the properties of different tunable lasers.
- Relate the properties of tunable lasers to those of other DWDM sources.
- Describe some of the practical implications of the use of tunable lasers.
- Describe the basics of gratings and their use in DFB and DBR lasers.

### Intended Audience

The course will be suited for participants who have some background in the field of optical sources for communication applications, and who want to catch up on tunable lasers. It will enable participants to follow the papers given on this topic during the conference.

### Instructor Biography



Jens Buus received the Lic. techn (Ph.D.) and Dr. techn (D.Sc.) degrees from the Technical University of Denmark. Since 1993, he has been with Gayton Photonics. He has been project manager of several European research projects, and is the (co)author of about 60 papers, 80 conference papers (including 20 invited), and three books. From 1998 to 2000, he was a LEOS distinguished lecturer, and he has served as a LEOS VP. Dr. Buus is a fellow of the IEEE.