



### Programme of Course "Photonic Networks"

- Code: DT0194
- Type of course unit: Elective (Laurea Magistrale in Ingegneria delle Telecomunicazioni curriculum Comune)
- Level of course unit: Postgraduate Degrees
- Semester: 2

Number of ects credits: (Laurea Magistrale in Ingegneria delle Telecomunicazioni) 6 (workload 150 hours)

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| <b>1</b> | <b>Course objectives</b>   | The main goal of this course is to provide students with the fundamentals of fiber-optic communications. These include transmission and reception of optical signals, propagation effects in optical fibers, and fiber-optic technologies. Students are expected to develop a solid understanding of the principles and criteria underpinning the design of a fiber-optic link.  |
| <b>2</b> | <b>Course content and learning outcomes (dublin descriptors)</b> | <p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• Introduction to fiber-optics</li> <li>• Modulation and detection</li> <li>• Optical fiber modes</li> <li>• Chromatic dispersion</li> <li>• Nonlinear effects</li> <li>• Optical transmitters</li> <li>• Optical receivers</li> <li>• Error probability</li> <li>• WDM and networks</li> <li>• Optical amplification, gain and noise</li> <li>• Dispersion compensation</li> <li>• Advanced systems</li> </ul>  |
| <b>3</b> | <b>Course prerequisites</b>                                      | The approach to this course is facilitated by some knowledge of Maxwell's equations and/or communication theory.   |
| <b>4</b> | <b>Teaching methods and language</b>                             | <p>Traditional lectures on the whiteboard will be supplemented with viewgraphs that will be made available to students. There will be sessions devoted to the use of Matlab for the simulation of fiber-optic transmission.</p> <p><b>Language:</b> English</p> <p><b>Reference textbooks</b></p> <ul style="list-style-type: none"> <li>• Govind P. Agrawal, <i>Fiber-optic communication systems - Fourth Edition</i>. Wiley. 2010. <a href="http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470505117.html">http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470505117.html</a></li> </ul> |
| <b>5</b> | <b>Assessment methods</b>  | Students will pursue a project during the course - most likely the implementation of an optical sub-system in Matlab. There will be an oral exam at the end of the course.   |