UNIVERSITY OF NEW SOUTH WALES
School of Electrical Engineering & Telecommunications
ELEC9355 Optical Communication Systems

Syllabus
S2 2008

Objectives
At the conclusion of this course, the students will have knowledge of:

1. Fundamental principles & techniques of optical fibre systems
2. Photonic components in optical communication systems
3. Design & application of various optical communication systems
4. Basic aspects of optical networks
5. Current topics & issues in optical communication systems

Lecturers
Assoc/Prof. G.D. Peng (Room 309, Electrical Engineering Building)

Reference
J. Senior: Optical Fibre Communications: Principles and Practice
G. Keiser: Optical Fibre Communications

Topic
Optical sources and detectors
Optical fibre lasers and amplifiers
Photonic components
Multiplexing techniques and systems
Analog and digital optical communication systems
Signal-to-noise ratio in optical communication systems
Optical networks
Nonlinear optical effects in optical fibres
Current issues & topics of optical fibre systems
Laboratory

The following four experiments will be done by each student during the course of study:

1. Measurement of Laser Characteristics
3. Optical Receiver Measurement
4. Measurement on Wavelength Division Multiplex System

The laboratory schedule and the student groups will be decided before the lab work starts. A lab risk assessment form (to be given later) is to be completed and signed before the start of your first experiment. The attendance of each laboratory session will be recorded by the lab demonstrator. 3 lab reports (the first 3 experiments you do) must be submitted by each student. You need to attach a signed covering sheet to each of your reports. Your lab report is submitted at the time you do the next experiment. Your overall lab performance will be marked by the lab demonstrator at the end of the session. You must do your 4th experiment to get the lab performance mark.

Lab demonstrator: Mark Hiscocks

Assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Laboratory report 1</td>
<td>5%</td>
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<tr>
<td>Laboratory report 2</td>
<td>5%</td>
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<tr>
<td>Laboratory report 3</td>
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<tr>
<td>Overall Laboratory Performance</td>
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<tr>
<td>Survey report</td>
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<td>Final Examination</td>
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<tr>
<td>Total</td>
<td>100%</td>
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More information

You are required to know the School's and University's policies about students' responsibilities, academic & other misconduct, special consideration, conduct of examinations, and the submission & assessment of assignments. You can find these at http://www.eet.unsw.edu.au/.

Any student who, by reason of disability, needs modification of his/her teaching or learning environment is encouraged to contact us or the University's Equity Officer (Disability) on 9385 4734.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic / Reference</th>
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</table>
| 1    | Introduction & Review  
Refs: Lecture note; Senior: Ch.1 & Ch.2, Keiser Ch.1-3, Ch.13 |
| 2    | Optical Fibre Lasers and Amplifiers  
Refs: Lecture note; Senior: Ch.6 & Ch.10, Keiser Ch.11, Ch.4 |
| 3    | Optical sources and detectors  
Refs: Lecture note; Senior: Ch.6-Ch.9, Keiser Ch.4, Ch.6 |
| 4    | Analog Optical Communication Systems  
Refs: Lecture note; Senior: Ch.11, Keiser Ch.9 |
| 5    | Wavelength Division Multiplexing  
Refs: Lecture note; Senior: Ch.11, Keiser Ch.10 |
| 6    | Digital Optical Communication Systems  
Refs: Lecture note; Senior: Ch.11, Keiser Ch.8 |
| 7    | Signal to Noise Ratio in Optical Communication systems  
Refs: Lecture note; Senior: Ch.11, Keiser Ch.7 |
| 8    | Nonlinear Optical Effects in Optical Fibres  
Refs: Lecture note |
| 9    | System components & considerations |
| 10   | Photonic Components  
Refs: Lecture note; Senior: Ch.5—Ch.10, Keiser Ch.10, Ch.4, Ch.5 |
| 11   | Other Multiplexing Systems  
Refs: Lecture note; Senior: Ch.11 |
| 12   | Optical Networks  
Refs: Lecture note; Senior: Ch.14, Keiser Ch.12 |