電気通信大学　平成20年度シラバス

授業科目名	Optical Communication Engineering		
英文授業科目名	Optical Communication Engineering		
開講年度	2008年度	開講年次	４年次
開講学期	前学期	開講コース・課程	昼間コース
授業の方法	講義	単位数	2
科目区分	総合文化科目-国際科目-		
開講学科・専攻	情報通信工学科 情報工学科 電子工学科 量子・物質工学科 知能機械工学科 システム工学科 人間コミュニケーション学科		
担当教官名	來住　直人		
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公開E-Mail	授業関連Webページ
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【主題および達成目標】

Optical communication is one of the most advanced communication technologies. It is only 20 years since optical communication systems have been practically implemented. Hence, the related technologies have still been developing very rapidly. In this course, principles, significances, and recent development of optical communication technologies are treated.

【前もって履修しておくべき科目】

Basic subjects in the field of electronic engineering and communication engineering, such as electromagnetism, wave and lightwave theory, circuit theory, and signal processing.

【前もって履修しておくことが望ましい科目】

【教科書等】

No specific textbooks are used. The materials in the class are prepared in PDF format in the above website. The access for the website from outside campus is protected by a password.

【授業内容とその進め方】

Since all materials are described in English, foreign students are able to catch up the course easily.　Japanese expression is partly introduced for Japanese students.

The contents are as follows.

1. Tutorial introduction to optical fibre communication

2. Properties of lightwave for communication

3. Optical fibre transmission lines

4. Light sources

5. Optical amplifiers

6. Optical devices for optical communications

7. Digital codings for optical communications

8. Optical communication systems

9. Optical fibre sensing systems

【成績評価方法及び評価基準(最低達成基準を含む)】

Qualification is done over the performance of reports and examination.

【オフィスアワー：授業相談】

12:30 to 14:30 of Wednesdays or the time after the class

【学生へのメッセージ】

Optical communication will be one of the key technologies for information and communication networks in the near future.
Hence it is essential to acquire the knowledges of its principles and technologies in order to have a good understanding of information and communication field.

【その他】

関連図1

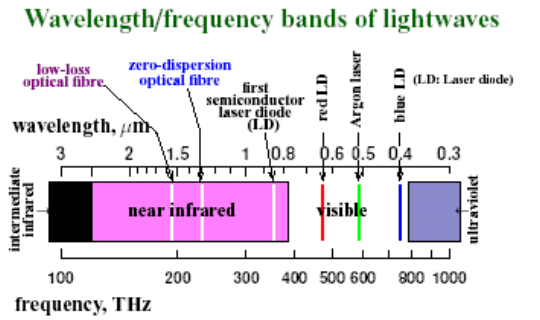

Figure 2.6 Optical frequency/wavelength around communication bandwidth

2.1 Lightwave as electromagnetic wave　Optical communication engineering 2007 Chap.2, No.13

関連図2

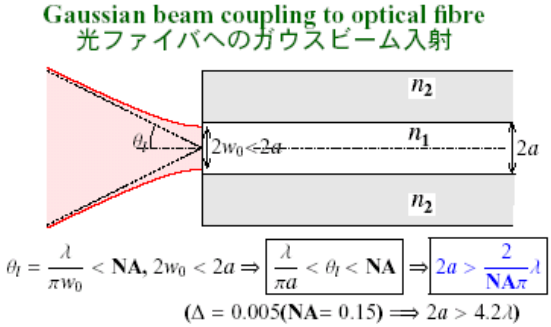

Figure 3.8 Relation between launchable beam diameter and NA (smaller NA(smaller Δ) allows larger core)

3.2 Silica optical fibre waveguides　Optical communication engineering 2007 Chap.3, No.11

関連図3

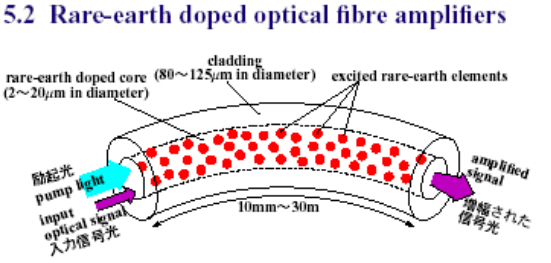

Figure 5.4 Laser action in optically-pumped rare-earth doped fibre

- **pump light(励起光): optical power supply to sustain population inversion for gain**
  信号利得に必須の反転分布生成のための光エネルギー供給源

5.2 Rare-earth doped optical fibre amplifiers　Optical communication engineering 2007 Chap.5, No.7

関連図4

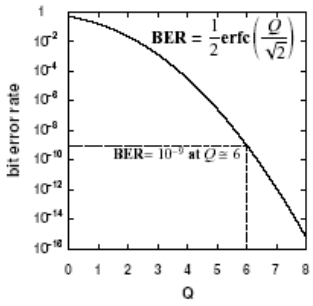

Figure 7.11 Bit error rate as a function of Q-factor

7.2 Parameters for performance evaluation　Optical communication engineering 2007 Chap.7, No.20