

# Fiber Optics and Biomedical Optics (VE552) for Summer 2016

Jigang Wu

**Pre-requisites:** VE434 (Principles of Photonics ) or permission of instructor.

**Course Description:** This course covers the basics of fibers and applications including light propagation, dispersion and loss, fiber technologies, nonlinearities in fibers, applications in communication and in biomedicine. This course also provides students with an understanding of current research and engineering applications in biomedical optics, including fundamental theoretical principles of tissue optics, computational approaches to light transport in tissues, biomedical optical imaging modalities.

**Textbooks:**

[1] Mitschke, F., Fiber optics: physics and technology, Springer 2010.

[2] L. V. Wang and H. Wu, Biomedical optics: principles and imaging, Wiley-Interscience 2007.

**Syllabus:**

Week 1-2: Propagation of light in fibers

Week 3: Dispersion and loss in fibers

Week 4-5: Technical conditions for fiber technology

Week 6: Nonlinear phenomena in fibers

Week 7: Midterm exam

Week 8-9: Applications of fibers in communication and biomedicine

Week 10: Light transport in biological tissue

Week 11-12: biomedical optical imaging modalities

Week 13: Final exam

**Grading policy:**

Homework: 50%, Midterm exam: 20%, Final exam: 30%

**Honor code policy:**

You must never show any other student your written work on the homework. You are allowed to talk about the course work (homework assignments), but may not communicate in writing. Of course, during exams, no communication of any kind (verbal or written) is allowed!