

Microscopy from Carl Zeiss

**Courses on
Modern Light Microscopy
and Digital Imaging**



**See, Learn and
Apply**





Perfect Mastery of Your Instrument – the Way to Efficient, Reliable Microscopy

The courses offered by Carl Zeiss impart the theoretical background as well as practical skills in many applications from biology, medicine and materials science.

Lectures are immediately followed by practical hands-on training in small groups.

Practical microscopy training has a long tradition at Carl Zeiss. The first courses were held in Jena as early as 1907. Initiated by two notable ZEISS scientists, Nobel prize winner Henry Siedentopf and the legendary August Koehler, the courses have since been continuously advanced and updated.

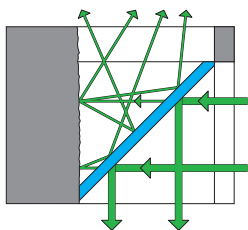
At our Applications Center you have access to the complete spectrum of our microscopy products – from the simple course microscope to digital imaging systems.

You will be trained on the best tools available to microscopy. There is no better access to learning the diversity of microscopical applications.

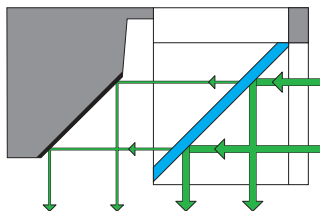
Attending the Carl Zeiss microscopy courses is an investment in your success.

An example of know-how taught in the courses:

The patented Carl Zeiss "light trap"



*Fluorescence beam path
without light trap:
Scattered light diminishes image contrast.*



*Fluorescence beam path
with light trap:
Scattered light eliminated - high image contrast*

The Basics of Microscopy: The Sure Way to Optimum Images of Your Specimens

Target group: Users of light microscopes

Prior skills required: None

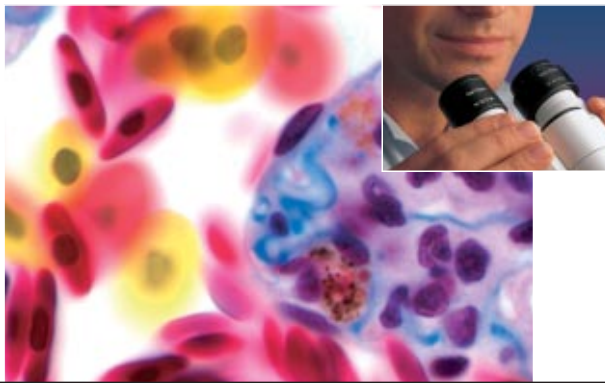
Light microscopy is the principal method of biomedical research and materials inspection. Skilful handling of the modern microscopes from Carl Zeiss is a key to your success in these fields.

You will learn to master the major techniques of microscopy (Koebler illumination, brightfield, darkfield, phase contrast). You will be enabled to decide positively which of these techniques will be optimum for a particular application.

- The microscope – design, beam path, functions and handling
- Koehler illumination and light sources
- Objective types
- Key applications of light microscopy in practice
- Care and maintenance

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 10



Principles of Digital Image Acquisition and Image Processing with AxioVision: Digital Images the Easy Way

Target group: Users of AxioVision; microscopists interested in digital image acquisition and processing

Prior skills required: Basic skills in using Windows 2000 or Windows XP

In recent years, the documentation and processing of micrographic images has changed from classical photomicrography to digital image acquisition.

Digital image processing has become a major tool of modern microscopy.

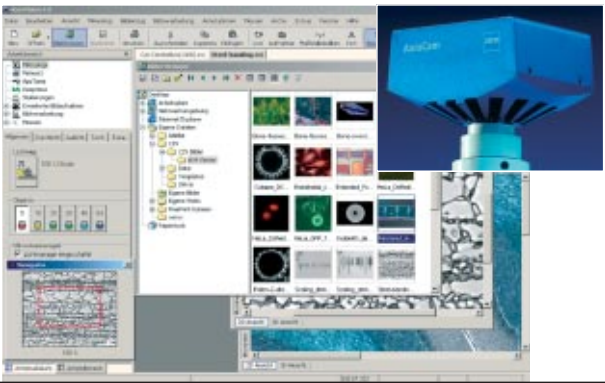
In this course you will use the latest AxioVision software and AxioCam digital cameras.

You will learn the perfect way to acquire, post-process, save and manage digital images.

- Theoretical principles of camera technology
- Fundamental operating concepts of AxioVision
- Image acquisition and image processing
- Scaling, scale bar, annotations
- Interactive measurement
- Saving and management of images
- Creation and maintenance of an image archive

Duration: One day, 9 a.m.– 4 p.m.

Participants: 8



Contrasting Methods in Biology and Medicine: High-Contrast Images of Non-Stained Specimens

Target group: Microscopists dealing with transparent biomedical specimens

Prior skills required: Basic skills in light microscopy (e.g., Course on "*The Basics of Microscopy*")

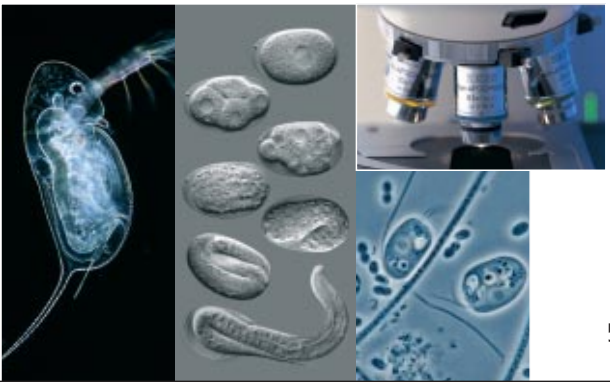
In many cases, living specimens such as cell cultures, tissue sections or transparent organisms cannot be stained. To image their details in satisfactory contrast, optical contrasting methods are required. Whether phase contrast, DIC, PlasDIC, darkfield or VAREL is the best choice for your specimen depends on many factors. These contrasting methods are increasingly important also for enhancing structures stained with fluorescent dyes and for live cell imaging.

You will learn to select, and perfectly use, the right contrasting method.

- The core of the microscope: choice of the optimum objective
- Brightfield: the classical method
- Darkfield: from limnology to apoptosis
- Phase contrast: the classical method in cellular biology
- DIC (Nomarski differential interference contrast): peerless in developmental biology
- PlasDIC: an innovative method for in-vitro microscopy
- Selecting the best contrasting method for your application

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8



Optimized Fluorescence Microscopy: Perfect, Non-Destructive Imaging of Your Specimen

Target group: Users of fluorescence microscopes

Prior skills required: Basic skills in light microscopy
(e.g., Course on "*The Basics of Microscopy*")

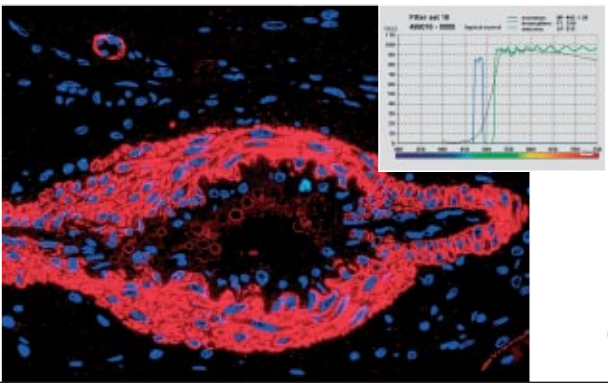
Fluorescence microscopy is rapidly gaining ground in many fields. Did you know that it was invented at Carl Zeiss? Whether you have never used a fluorescence microscope before, want to put your equipment to extended use, or get added information out of your specimens, this course is made for you.

You will be taught how to set up your fluorescence microscope best, and how to get optimum results without damaging your specimens. You will be able to select the right set of filters, out of many, for your application. You will learn how to replace the fluorescence lamp and to adjust the illumination.

- Principles of fluorescence microscopy and design of the fluorescence microscope
- Light sources, fluorescence filters and objectives
- Interpretation of spectral curves of fluorescent dyes and filter sets
- Innovative methods of adjusting the fluorescence microscope
- Care of the fluorescence microscope

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8



Digital Life Science Microscopy: Multidimensional Documentation of Your Specimen

Target group: Users of AxioVision concerned with biological and medical problems

Prior skills required: Fluorescence microscopy (e.g., Course on "*Optimized Fluorescence Microscopy*"); Basic skills in using AxioVision (e.g., Course on "*Principles of Digital Image Acquisition and Image Processing with AxioVision*")

Fully automatic microscope systems, high-resolution digital cameras, multichannel fluorescence images, Z stacks, and time-lapse series are the key words in modern life science imaging.

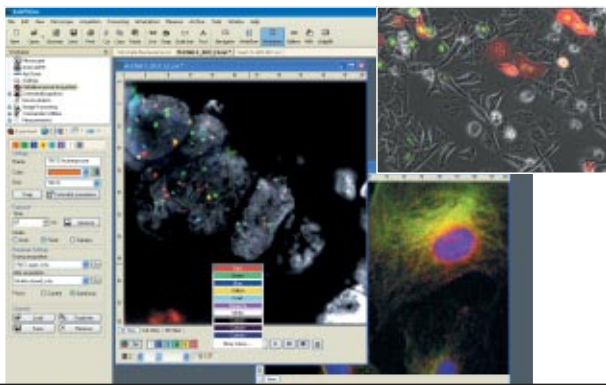
The acquisition of perfect multidimensional images hinges on the optimum interaction of motorized microscopes with digital cameras and dedicated software. In this course you will work with the latest AxioVision software, AxioCam digital cameras, and our most advanced research microscopes.

You will learn to make the best, practice-related use of the methods of life science imaging.

- Control of motorized microscopes
- Acquisition of multichannel fluorescence, time series and Z stack images
- Compilation of complex, automated procedures ("experiments")
- Ways to improve multidimensional image data
- Saving, exporting and documenting multidimensional images

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8



Optical Sectioning with the ApoTome: The Innovative Dimension in Fluorescence Microscopy

Target group: Microscopists dealing with fluorescent biomedical specimens

Prior skills required: Fluorescence microscopy (e.g., Course on "*Optimized Fluorescence Microscopy*")

Photomicrographs of thin fluorescent specimens are of outstanding brilliance. Many fluorescent objects, though, are too thick to yield well-defined, high-contrast images with conventional microscopes.

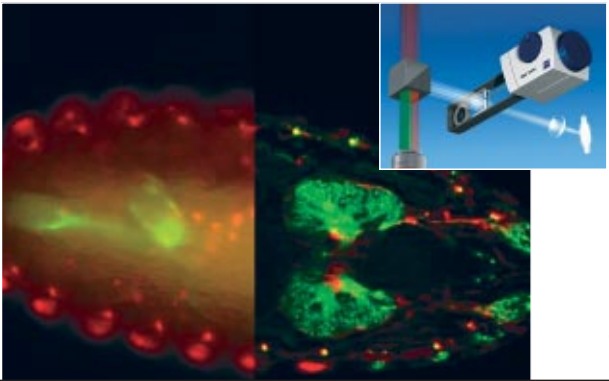
The ApoTome creates ultrathin optical sections of thick or overstained objects. Stacks of such sections provide fluorescent images that are sharp and rich in contrast. The image stacks can also be assembled into 3D views. Thanks to their high contrast, ApoTome images show an amazing lot of detail.

The course will teach you how to use the ApoTome with your specimens in the most efficient way.

- Operating principle of the ApoTome
- Calibration and setting of the ApoTome
- Acquisition of multichannel fluorescent images
- Creation of Z image stacks and 3D views
- Comparison of methods to create optical sections

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 6



3D Deconvolution with AxioVision: High Image Definition through Optical Sectioning

Target group: Researchers with fluorescence microscopical applications

Prior skills required: Proficiency in fluorescence microscopy and digital imaging (e.g., Courses on "*Optimized Fluorescence Microscopy*" and "*Digital Life Science Microscopy with AxioVision*")

Deconvolution is a sophisticated method to improve the quality of fluorescent image stacks. The 3D Deconvolution module of the AxioVision software from Carl Zeiss is a powerful, yet easy-to-use solution.

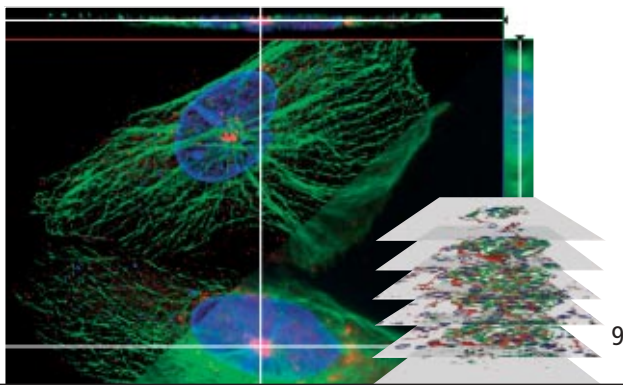
This course is intended for users who have not yet worked with 3D deconvolution or wish to optimize their results.

You will learn to set up the hardware and software, to acquire image stacks that are optimum for the method, and to use 3D deconvolution efficiently.

- Methods of optical sectioning (deconvolution, confocal microscopy, structured illumination)
- Basic theory of 3D deconvolution
- Setting up the hardware and software
- Practice of 3D deconvolution
- Inside4D module of AxioVision (creating 3D animations)

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 6



Contrasting Methods in Materials Science: High-Contrast Imaging of Metals, Polymers and Minerals

Target group: Microscopists examining materials specimens in transmitted and reflected light

Prior skills required: Basic skills in light microscopy (e.g., Course on "*The Basics of Microscopy*")

As more and more innovative materials are being designed, this field of microscopy experiences a revival. The materials microscope is a tool needed by many workers in the materials field – metallographers, mineralogists or quality inspectors.

The use of optical contrasting methods enables you to optimally visualize relevant properties of your samples.

You will learn to master brightfield, darkfield, polarization, epi-interference contrast and innovative techniques such as C-DIC and TIC and to select the method that is best for the respective specimen.

- Optimum contrasting for your application
- Brightfield: the routine method
- Darkfield: for finest structures or pigments
- Polarization: birefringence made visible
- Epi-DIC (Reflected-light Nomarski differential interference contrast): detects smallest height differences
- C-DIC and TIC: innovative methods for defect analysis and height measurement
- Simple geometric measurements: a key application

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8



Digital Microscopy of Materials: Correct Documentation, Precise Analysis

Target group: Users of AxioVision investigating materials

Prior skills required: Basic skills in using AxioVision (e.g., Course on "*Principles of Digital Image Acquisition and Image Processing with AxioVision*")

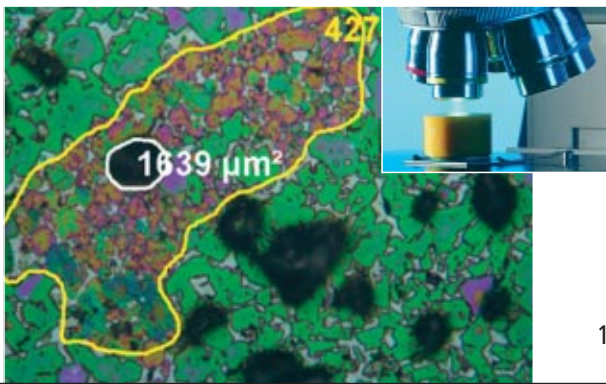
From geosciences to materials research and design to industrial quality control and inspection: more and more laboratories make use of the advantages of digital microscope systems. Features considered important are ease of operation, reproducible results, and data-preserving documentation.

You will learn how to automate image acquisition with AxioVision. Other key subjects of this course are expanded acquisition techniques, the documentation and management of your images, and the preparation of reports.

- Automation of image acquisition
- Preparation, saving and editing of reports
- Use of archives
- Interactive measurements
- Expanding the depth of field

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8



Quantitative Analysis of Microscopical Images: Precise Measurements in Images

Target group: Users of automated measurement applications

Prior skills required: Basic skills in using AxioVision (e.g., Course on "Principles of Digital Image Acquisition and Image Processing with AxioVision")

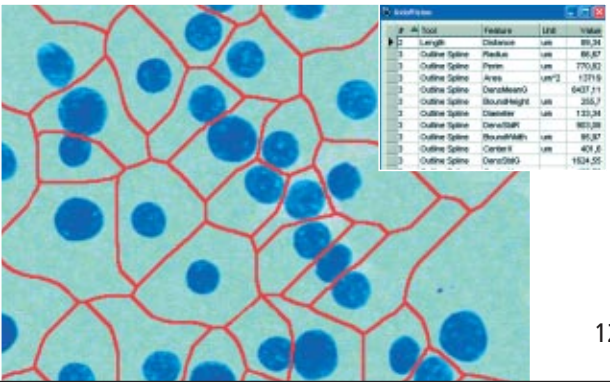
Quantification is essential to the solution of many problems approached by modern microscopy. Even the basic version of AxioVision permits simple interactive measurements, e.g. of lengths, areas and angles. With the AutMess extension module, any number of images can be measured automatically in succession. In intensive exercises you will compile measurement programs and do serial examinations. The skills you learn are immediately applicable in your daily practice.

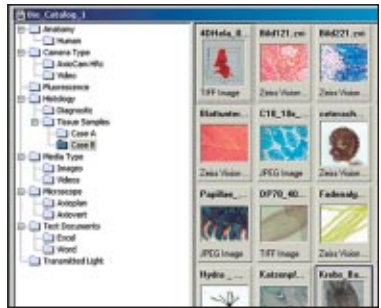
You will get familiarized with digital image analysis as a prerequisite to obtaining correct measurement results.

- Theoretical principles of digital image analysis
- Introduction to image analysis with the AxioVision software, version 4
- AutMess, a module extending AxioVision
- Practical exercises with image analysis systems, preparation of specific measurement programs, performing serial examinations
- Individual adaptation of the systems

Duration: Two days, 9 a.m.– 4 p.m.

Participants: 8





Location

Carl Zeiss
Light Microscopy Application Center
Königsallee 9-21
37081 Göttingen
Germany

We will gladly hold custom-specific courses at your place, or render professional assistance to courses organized by you.

Dates

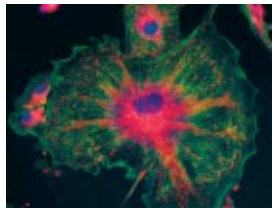
Visit us at www.zeiss.de/courses to find the next date for the course of your choice and to register.

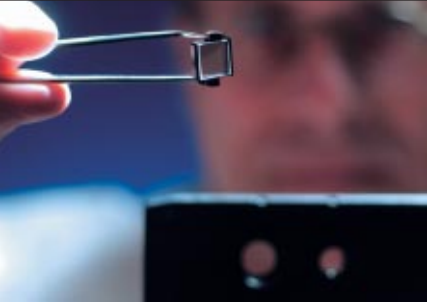
Course Materials

You will get comprehensive, easily understood course material (written in the course language), which you can refer to when practicing your newly acquired skills and knowledge at your place.

Certificates

Carl Zeiss will issue a certificate of attendance to every course participant.





Trainers

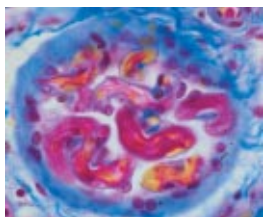
Your trainers are graduated scientists with rich experience in light microscopy and its practical applications in the biomedical and materials fields.

This combination of technical and applications know-how is just the right mixture to get your theoretical and practical questions answered.

Our own continuous education as well as cooperation projects with users in industry and scientific institutions (e.g., Woods-Hole Laboratories, EMBL, Max Planck Society, Institute Pasteur) guarantee that your trainers are always up to date.

Language

The courses can be held in either English or German.





Welcome to One of the Birthplaces of Modern Microscopy

Carl Zeiss courses are held on the premises of the world's oldest operating microscope factory.

The former "Optische Werkstätte Rudolf Winkel GmbH", acquired by Carl Zeiss in 1911, has since been the birthplace of more than 1,000,000 ZEISS microscopes.

Today, this is one of the most advanced manufacturing and assembly plants for routine and research-grade microscopes. A guided tour of the plant (offered as an option during the course) provides a look behind the scenes at modern microscope making.

The university town of Göttingen, nestling in a beautiful scenery, has many charms. The old town with its medieval half-timbered houses and the world's most frequently kissed girl (the "Gänseliesel" statue) provides a pretty backdrop for the vigorous life of a place of study and research.



