

Biomedical Visualization (BVIS)

Courses

BVIS 500. Biomedical Visualization Techniques. 2 hours.

Introduction to methods and techniques for biomedical visualization. Topics include illustration, 3D modeling, animation, interactive and mobile media, computer programming, gaming, haptics, augmented and virtual reality. Course Information: Extensive computer use required. Meets 8 weeks of the semester. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 501. Professional Practices in Biomedical Visualization. 1 hour.

Designed to introduce the BVIS graduate program, professional practices including history of the profession, professional communications, application of metadata to digital files, and an introduction to copyright. Course Information: Meets eight weeks of the semester.

BVIS 502. Clinical Sciences for Biomedical Visualization. 3 hours.

Students experience the clinical setting under supervision of UIC residents and attending physicians. Includes an introduction to the surgical specialties, surgical techniques and surgical sketching. Course Information: Previously listed as BVIS 400. Field work required. Prerequisite(s): BVIS 505 and BVIS 510 and BVIS 552; and consent of the instructor.

BVIS 503. Strategic Inquiry in Biomedical Visualization. 3 hours.

Overview of research in BVIS includes IRB; statistics; research ethics; research proposal development including background and justification; literature review; research questions, arguments and methods; and discussion of anticipated results. Course Information: Extensive computer use required. Prerequisite(s): BHIS 499.

BVIS 504. Visual Storytelling in Biomedical Visualization. 2 hours.

Provides students with a foundation in visual storytelling, supporting exploration of the fundamental tools of visualization, including storyboarding for digital media, composition, as well as visual literacies. Course Information: Meets eight weeks of the semester. Class Schedule Information: To be properly registered, students must enroll in one lecture-discussion and one laboratory.

BVIS 505. Visual Learning and Visual Thinking I. 2 hours.

Provides students with the foundation of visual thinking and learning as it applies to life science, healthcare, and medicine. Class Schedule Information: To be properly registered, students must enroll in Lecture and one Laboratory-Discussion.

BVIS 508. Pathophysiology for Biomedical Visualization. 3 hours.

Building on basic anatomy and physiology, this course focuses on pathophysiology and visualization methods of common human diseases and disorders including etiology and symptoms. Course Information: Prerequisite(s): ANAT 411; or consent of instructor. Class Schedule Information: To be properly registered, students must enroll in one Discussion/Recitation and one Lecture.

BVIS 510. Anatomical Visualization. 3 hours.

Graphic manipulation and representation of human morphology and gross anatomy. Graphic construction skills, visual standards and conventions, data collection methods, and personal sketch style development. Course Information: Previously listed as BVIS 405. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 518. Web Design. 2 hours.

Introductory principles in web design for science and healthcare, including: mobile-first design; accessibility; user experience; basic HTML and CSS; web-based industry tools including eLearning; and version control programs (GitHub). Course Information: Previously listed as BVIS 415. Extensive computer use required. Prerequisite(s): Students who are not enrolled in the MS in Biomedical Visualization need to obtain consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 519. Modeling I. 3 hours.

An introduction to the aesthetic and technical aspects of digital modeling, texturing, lighting, rendering and compositing techniques used in biomedical images and visualization. Course Information: Previously listed as BVIS 540. Extensive computer use required. Prerequisite(s): BVIS 552. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 520. Modeling II. 3 hours.

Advanced instruction in the aesthetic and technical aspects of digital modeling, including model optimization, advanced modifiers, and application of advanced concepts in several modeling programs. Course Information: Extensive computer use required. Prerequisite(s): BVIS 519. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

BVIS 521. Modeling III. 2 hours.

Advanced instruction in the aesthetic/technical aspects of digital modeling, including advanced sculpting/painting techniques, material manipulation, lighting, model optimization, and application of advanced concepts in several 3D modeling programs. Course Information: Extensive computer use required. Prerequisite(s): BVIS 520. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

BVIS 522. Illustration Techniques. 3 hours.

Introduction to line, continuous tone and color rendering techniques. Digital image creation and manipulation, color theory and design, print and electronic publication issues. Course Information: Previously listed as BVIS 420. Prerequisite(s): BVIS 510 Anatomical Visualization. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 523. Haptics. 4 hours.

Hands-on course on fundamental concepts of haptics technology applied to medical visualization, simulation, and training. Course Information: Same as BIOE 523. Extensive computer use required. Recommended Background: Basic computer programming experience. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

BVIS 530. Surgical Illustration. 4 hours.

Students attend surgery, research surgical procedures and prepare illustrations for educational and commercial use. Students integrate knowledge of instructional design, anatomy, graphic design, and illustration techniques. Course Information: Prerequisite(s): ANAT 441 and BVIS 522 and BVIS 528 and BVIS 535 and BVIS 552. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 535. Visual Learning and Visual Thinking II. 2 hours.

Provides students advanced skills in visual learning and thinking, including information hierarchy, information graphics, selection of evaluation methods for testing of visual message(s) and advanced paper prototyping. Course Information: Previously listed as BVIS 440. Prerequisite(s): BVIS 505. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 536. Serious Game Development. 3 hours.

Design and develop games and educational tools using techniques and principles essential to interactive program development. This includes game-based learning and gamification, user interface wireframing, and an introduction to programming languages. Course Information: Extensive computer use required. Prerequisite(s): BVIS 505 and BVIS 518. Recommended Background: BVIS 535. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

BVIS 537. Advanced Serious Game Development. 2 hours.

Design and develop games and educational tools using advanced techniques and principles in the Unity game engine. This includes an advanced exploration of C# programming principles. Course Information: Extensive computer use required. Meets eight weeks of the semester. Prerequisite(s): BVIS 536. Recommended Background: BVIS 535. Restricted to students in the following majors: Biomedical Visualization: MS. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

BVIS 538. Medical Legal Visualization. 2 hours.

Advanced visualization and application of radiographic imaging data for effective communication of both complex and sequential concepts used in the medical legal and courtroom environment. Course Information: Prerequisite(s): BVIS 505 and BVIS 510 and BVIS 522. Class Schedule Information: To be properly registered, students must enroll in one Lecture-Discussion and one Laboratory.

BVIS 539. Immersive Interactive Visualization. 3 hours.

Advanced concepts in interactivity production with a focus on Virtual Reality and Augmented Reality. Provides experience with various project builds for standalone and mobile VR applications. Course Information: Extensive computer use required. Prerequisite(s): BVIS 505; and VIS 518; and BVIS 536. Recommended Background: BVIS 537. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

BVIS 541. Animation I. 2 hours.

Introduces principles of the animation production pipeline (e.g. choosing a specific target audience, script, storyboard, audio, motion, lighting, rendering, compositing). Course Information: Previously listed as BVIS 545. Extensive computer use required. Prerequisite(s): BVIS 518 and BVIS 535. Recommended background: BVIS 500. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 542. Animation II. 3 hours.

This intermediate course explores lighting, basic special effects, in-camera visual effects, basic particle systems, motion modifiers, production management and use of a render farm. Course Information: Extensive computer use required. Prerequisite(s): BVIS 518 and BVIS 540 and BVIS 541. Recommended background: BVIS 520. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 543. Animation III. 4 hours.

Focuses on molecular visualization, rigging, camera mapping, advanced camera moves, advanced lighting and advance materials Introduction to node-based particle systems (PFlow) and dynamic simulations (MassFX). Course Information: Extensive computer use required. Prerequisite(s): BVIS 542. Recommended background: BVIS 519 and BVIS 520. Class Schedule Information: To be properly registered, students must enroll in one Lecture and one Laboratory.

BVIS 544. Animation IV. 4 hours.

Instruction in advanced lighting, advanced special effects, Maxscript, rigging, particle systems, morph targets, compositing, development of a demo reel, and optimization/exporting assets for game engines. Course Information: Previously listed as BVIS 525. Taught in English. Extensive computer use required. Prerequisite(s): BVIS 543. Recommended background: BVIS 519 and BVIS 520. Class Schedule Information: To be properly registered, students must enroll in one Lecture and one Laboratory.

BVIS 546. Virtual Reality and Stereography in Biomedical Visualization. 2 hours.

Introduction to 3D perception; digital 3D model creation; 3D presentation methods; computer configuration for 3D display; virtual reality in medicine. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 547. 360 Animation. 2 hours.

Animating in 360 degrees for immersive storytelling in virtual reality for biomedical topics. Course Information: Extensive computer use required. Prerequisite(s): BVIS 542. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 548. Advanced Illustration Techniques. 3 hours.

An investigation of advanced biomedical illustration techniques through the process of topic research, goal analysis, concept and sketch development, and technique and style exploration. Course Information: Extensive computer use required. Prerequisite(s): BVIS 510 and BVIS 515 and BVIS 522. Class Schedule Information: To be properly registered, students must enroll in one Discussion and one Laboratory.

BVIS 551. 3D Printing with Data Segmentation for Medicine. 2 hours.

An introduction to 3D printing and digital segmentation/modeling of medical imaging data as applied to biomedical visualization and medicine. Course Information: Extensive computer use required. Meets eight weeks of the semester. Consent of the instructor is needed for non-BVIS majors. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

BVIS 552. Graphic Design. 2 hours.

Core concepts of graphic design in relation to the health sciences. Topics include typography, graphic elements, images, and the use of color to communicate general health concepts. Course Information: Previously listed as BVIS 450. Extensive computer use required. Meets eight weeks of the semester. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 560. Molecular Pharmacology for Biomedical Visualization. 3 hours.

Foundation in molecular pharmacology with advanced research and visual communication skills to solve scientific communication problems for all audiences: scientist, investor, business and medical professional. Course Information: Extensive computer use required. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

BVIS 562. Advanced Graphic Design. 3 hours.

Advanced concepts of graphic design communication including symbolic graphic translation, logo mark design with a focus on concept development, and branding for the health sciences. Course Information: Previously listed as BVIS 515. Extensive computer use required. Prerequisite(s): BVIS 552. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BVIS 575. Business Practices in Biomedical Visualization. 2 hours.

Business practices for biomedical visualization professional including communication, negotiation, ethics, copyright, licensing, proposals, contracts, business structure, project management, finance, branding, marketing, portfolio, and presentations. Course Information: Previously listed as BVIS 480. Prerequisite(s): BVIS 501.

BVIS 580. Practicum in Biomedical Visualization. 1-12 hours.

Field experience under supervision of a professional expert in a biomedical communication setting that is consistent with student's area of concentration and career goals. Course Information: May be repeated. Prerequisite(s): Consent of the instructor.

BVIS 594. Special Topics in Biomedical Visualization. 1-4 hours.

An in depth study of a biomedical visualization topic of importance selected by the faculty. Course Information: May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BVIS 595. Seminar in Biomedical Visualization. 1 hour.

Topics of current interest in biomedical visualization. Includes discussion of relevant journal articles and important new developments in the field. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated.

BVIS 596. Independent Study. 1-4 hours.

For graduate students who wish to pursue independent study of special problems in the student's area of interest not related to their project/thesis research. Course Information: May be repeated. Students may register in more than one section per term. Prerequisite(s): Graduate standing and consent of the instructor.

BVIS 597. Project Research. 0-4 hours.

Independent investigation that draws upon the professional experience and knowledge synthesis of the student. Students investigate a topic/problem in their field, document a visualization project or write a paper, and deliver an oral presentation. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): BHIS 499 and BHIS 500; and consent of the instructor.

BVIS 598. Research in Biomedical Visualization. 0-16 hours.

Independent research in biomedical visualization directed by a faculty member. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): BHIS 499 and BHIS 500; and consent of instructor.