

COMPUTER SCIENCE, DESIGN AND JOURNALISM

Chair: David Reed

Department Office: Hitchcock Communication Arts Building, Room 209-A

The Department of Computer Science, Design and Journalism prepares students for professional careers and graduate study in fields ranging from computer science, media, design to film. Majors and tracks include computer science, digital development, graphic design, filmmaking, advertising, news, and public relations. Courses emphasize the development of critical thinking, problem-solving, visual communication, and multimedia skills. In each of the majors and tracks, students gain practical knowledge and theoretical foundations while building the critical reasoning and communication skills for these fast-evolving fields. Students gain hands-on experience through research, internships, memberships in professional organizations, student media and Backpack Journalism.

Computer Science and Informatics (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/computer-science/>)

- Choose Computer Science track or Digital Development track

Journalism (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/journalism-tracks/>)

- Choose Advertising, News or Public Relations track

Graphic Design (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/graphic-design/>)

- Choose Graphic Design track or Multi-Media & Filmmaking track

Data Science (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/data-science-major/>)

Minors in Computer Science, Design and Journalism

- Computer Science (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/computer-science-minor/>)
- Graphic Design (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/graphic-design-minor/>)
- Journalism (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/journalism-minor/>)

Associate of Science (A.S.) Degree

This department offers the following associate degrees.

- Computer Science (<http://catalog.creighton.edu/undergraduate/arts-sciences/as-computer-science/>)

Certificate Programs

- Computer Science Certificate (<http://catalog.creighton.edu/undergraduate/arts-sciences/journalism/computer-science-cert/>)

Courses

CSC 111. Basics of Coding. 3 credits. OD

An introduction to programming and problem-solving in which students create interactive applications and systems through project-based learning. Students will learn problem solving, software design, debugging strategies, and the foundations of computer science (data structures, procedures, and algorithms).

CSC 121. Computers and Scientific Thinking. 3 credits. FA, SP

An introduction to science and scientific reasoning from a perspective that integrates computer science and the natural sciences. Students will gain a basic understanding of computer technology and how computers and computer modeling are used in various scientific disciplines. Methods and applications from the biological sciences will be emphasized.

CSC 221. Introduction to Programming. 3 credits. FA, SP

A first course in computer programming and problem solving, with an emphasis on designing and developing solutions to real-world problems (such as system modeling, data analysis, and multimedia processing). Specific topics include algorithm development, basic control structures, simple data types and data structures.

CSC 222. Object-Oriented Programming. 3 credits. SP

A second course in computer programming, emphasizing the object-oriented approach to software development. Specific topics include object-oriented design, classes and objects, encapsulation, list processing, and recursion. P. CSC 221.

CSC 321. Data Structures. 3 credits. FA

An introduction to fundamental data structures used in solving problems, including the programming and mathematical concepts required to implement and analyze data structures. Specific data structures include lists, stacks, queues, linked structures, sets, and maps. Supporting concepts include logic, proof techniques, and basic graph theory. P. CSC 222.

CSC 414. Introduction To Computer Organization. 3 credits. SP

An introduction to the organization and design of modern computing devices. Topics include basic addressing modes, instruction formats and interpretation, I/O devices, memory organization, and microprogrammed control. P. CSC 221.

CSC 421. Algorithm Design and Analysis. 3 credits. SP

An advanced problem-solving course that focuses on the design, implementation, and analysis of algorithms. Specific algorithmic approaches include divide-and-conquer, greedy, backtracking, and dynamic programming. The connections between algorithms and data structures, such as trees and hash tables, are highlighted. P. CSC 321.

CSC 426. Data Visualization. 3 credits. (Same as GDE 426)

In today's world we are inundated with data. So much so that it is often overwhelming, confusing, and ultimately meaningless. By combining the principles of art, design, and statistics, Data Visualization teaches the tools and methods to harness that data and make it meaningful. Enabling clear communication and setting up the possibility for deep insights. P. GDE 324 or CSC 121.

CSC 444. Human Computer Interaction. 3 credits. OD

An introduction to human computer interaction and design thinking, including the design and prototyping of interactive technologies using the User Centered Design philosophy. Students will learn how to conduct and analyze user research, and practice the process of ideating, prototyping, and evaluating their designs.

CSC 445. Social Networks Analytics. 3 credits.

This course provides an introduction to graph theory, social network analysis, and data mining. Students will learn the current trends in social network research, understand the theories behind it, collect data from various sources, use social cyber forensics techniques to extract metadata, and apply what's learned to extract meaningful insights. Prereq: CSC 221.

CSC 450. Data of/by/for the People. 3 credits. SP

Data arising from and about the 24th Street Corridor is the focus of this course, which gives an overview of quantitative research methods and focuses the students experientially on planning, gathering, cleaning, and analyzing data from community stakeholders. Students will design and develop data-driven projects using programming and statistical software. Note: this course may not count toward the CSI major, minor, A.S. degree, or Certificate. P. Critical Issues in Human Inquiry or HRS 100 ; Mathematical Reasoning; Senior standing.

CSC 493. Directed Independent Readings. 1-3 credits. OD

A directed reading course investigating current topics in computer science. May be repeated for credit to a limit of six hours. P. IC.

CSC 495. Directed Independent Study. 1-3 credits. OD

A directed study course investigating current topics in computer science. May be repeated for credit to a limit of six hours. P. IC.

CSC 497. Directed Independent Research. 1-3 credits. OD

A research project under the guidance of a member of the faculty. May be repeated for credit to a limit of six hours. P. IC.

CSC 499. Directed Internship. 1-3 credits. OD

Students gain professional experience by placement in a computing company or information technology department on a part-time basis for one semester. Students will work closely with a faculty advisor to define the project, identify its academic content, and report on its results. P. IC.

CSC 525. Theory of Computation. 3 credits. OD

A study of models of computing and the theoretical limitations of computation. Specific topics include formal grammars, finite state machines, Turing machines, and computability. P. CSC 421.

CSC 533. Programming Languages. 3 credits. SP

A survey of modern languages, including their design and implementation. Specific topics include declarative programming, procedural programming, scripting, syntax and semantics, program management, data types, and control structures. P. CSC 321.

CSC 542. Database Design and Security. 3 credits. OD

A survey of techniques for designing and implementing databases using a relational model. Specific topics include relational algebra, SQL, normal forms, database design, concurrency control, and error recovery. P. CSC 321.

CSC 548. Software Engineering. 3 credits. FA

A project-based course that utilizes industry-proven methodologies for the design, implementation, and management of software projects. Specific topics include team coordination, UML modeling, design specifications, version control, reusability, and testing. P or Co: CSC 321.

CSC 550. Introduction To Artificial Intelligence. 3 credits. OD

A survey of foundational concepts and current research in artificial intelligence. Specific topics include knowledge representation, search methods, expert systems, machine learning and perception, neural networks, and emergent systems. P. CSC 222.

CSC 551. Web Programming. 3 credits. FA

An advanced study of Internet and Web protocols and the integration of programming techniques with a Web interface. Both client-side and server-side programming are covered, with topics including HTML, client-side scripting, server-side programming via the Common Gateway Interface, and current development technologies. P. CSC 222 or CSC 121 and CSC 221.

CSC 555. Computer Graphics. 3 credits. OD

This course covers the algorithms and technology for developing and manipulating graphical images on a computer. Topics include graphics display devices, digital storage, interactive versus passive graphics, and the mathematics of 2-dimensional and 3-dimensional transformations. P. CSC 421.

CSC 581. Mobile App Development. 3 credits. SP

This project-based course presents the fundamental concepts and techniques of mobile application development. Specific topics include modern design methodologies, mobile resource limitations, development tools, and project management. P. CSC 222.

CSC 590. Special Topics. 3 credits.

This course provides an in-depth examination of one or more current topics in computer science, through a combination of lecture, discussion and student presentations. P. IC.

CSC 599. Senior Capstone. 3 credits. FA

This project-based capstone is intended for computer science seniors. Each student will design, implement, and present a project that integrates computer science content from his or her major courses. Seminal papers and results in computer science will be selected and reviewed in a seminar-style setting, with emphasis on the ethical and professional responsibilities of computer scientists. P. CSI major; Ethics course; Oral Communication course.

GDE 300. Concept Sketch Development. 3 credits.

This course explores the creation of digital concept sketches from storyboards and websites to product design and branding concepts.

GDE 302. Community Mural Design. 3 credits.

Students learn to design a mural with a community as well as sketching techniques and history of murals.

GDE 324. Digital Foundations. 3 credits. FA, OD, SP, SU

This course teaches the basics of designing graphics and imagery and then how to publish it online using a content management system such as Wordpress.

GDE 370. Video and Photo. 3 credits. FA, SP

An introduction to beginning digital video and photography as it relates to journalism. Students will effectively use still and video and other new media forms including the fundamentals of shooting (including composition, lighting, audio, etc) and editing with the goal of effective storytelling, including creating a short mini-documentary.

GDE 374. Video and Filmmaking. 3 credits. OD, SP

Students learn how to shoot, produce and edit digital video short format projects for online and mass media distribution. P. GDE 370 or IC.

GDE 375. Photojournalism I. 3 credits.

The course introduces photography as a means of reporting the news, including the use of film and/or digital cameras to prepare photographs for print or Web publication.

GDE 380. Graphic Design. 3 credits. FA, OD, SP

This course introduces design of the printed page using typography, photographs and graphics. Students learn through hands-on computer assignments and critiques. P. GDE 324, Ethics course, Mathematical Reasoning course.

GDE 381. Graphic Design II. 3 credits. SP

The course uses a variety of computer graphic tools to further develop skills and creativity in illustrating editorial and visual ideas. Students will work with and combine visual elements from photographs and artwork. Course includes on service-learning project of designing for a community organization. P. GDE 380.

GDE 382. Web Design. 3 credits. FA, SP

The course introduces the design of online publications, including elements of online layout, typography and graphics to create well-designed web sites. P. GDE 324 and CSC 121.

GDE 385. Computer Illustration. 3 credits.

Illustrating editorial and visual concepts using the computer. Students will work digitally and combine visual elements from photographs, artwork and various imaging, but will focus on creating original raster and vector illustrations.

GDE 410. Motion Graphics. 3 credits. SP

Learn to create static graphics with the intent on animation. Create typography and motion/moving graphics, including storyboards, web preparation, and preparation for video. Each student will pitch ideas and discuss with class, and participate in critiques in order to improve content and motion graphic projects. Students will learn to quickly develop concepts and explain their ideas via digital concept sketches. P. GDE 380 and GDE 370.

GDE 423. Interaction Design. 3 credits.

This course explores the fundamental technologies of interaction design on the web and in the world. These explorations will be underpinned by the thoughts and theories of leading interaction designers. At the end of this course students will have an understanding of how interaction works, why it works, and what to do when it doesn't work. Students will develop an innate understanding of effective communication in visual and interactive modalities. P. GDE 382.

GDE 424. Typography and Advanced Projects. 3 credits. OD

The course is an intense examination of the use of typography in both historical and modern contexts. Students will learn effective ways to utilize type in a variety of digital and print media, with lectures in aesthetic, strategic and technical use of final projects that will showcase the strategic use of appropriate custom digital and hand-rendered typography. P. GDE 380.

GDE 425. 3D Digital Design. 3 credits. FA

An advanced 3D computer graphics course that creates virtual 3D designs for prototyping on 3D printers or other delivery methods. Students will learn the basics of designing in three dimensional space. P. GDE 324.

GDE 426. Data Visualization. 3 credits. (Same as CSC 426)

In today's world we are inundated with data. So much so that it is often overwhelming, confusing, and ultimately meaningless. By combining the principles of art, design, and statistics, Data Visualization teaches the tools and methods to harness that data and make it meaningful. Enabling clear communication and setting up the possibility for deep insights. P. GDE 324 or CSC 121.

GDE 455. Projects in Communication. 1-3 credits. FA, SP, SU (Same as JRM 455)

Students develop a project in any of the mass media that is approved by a faculty member. The course may be repeated until a maximum of six credit hours has been accrued. Graded Satisfactory/Unsatisfactory. P. IC.

GDE 474. Mini-Documentary Filmmaking. 3 credits. OD, SP

Learn to create mini-documentaries collaboratively as a class on a 15-25 minute documentary project. This course advances all of the concepts begun in the videos classes, but culminates in a professional-level film that can be submitted to student film festivals. Advanced shooting, lighting, audio and editing techniques will be covered. P. GDE 370.

GDE 493. Directed Independent Readings. 1-3 credits. FA, SP, SU (Same as JRM 493)

Students work with a faculty member who agrees to supervise the directed independent readings. May be repeated until a maximum of six credit hours has been accrued. P. IC.

GDE 590. Special Topics. 3 credits. OD, SP

This course provides an in-depth examination of one or more current topics in graphic design and media, through a combination of lecture, discussion and student presentations. P. IC.

GDE 599. Senior Capstone. 3 credits. FA

The Graphic Design Senior Capstone course is designed specifically for graphic design majors. All students will create a major design project that integrates and demonstrates the various visual communication skills they have learned over the course of the major. The project will include written proposals and several stages of group presentation and critique. The project will include materials both online and printed, and should have a collaborative component that involves working with either a client or another student on a large scale project. Additionally, students will reflect on their experience in a blog setting, and engage in critical discussion on current professional practices and projects. P. Oral Communication course, Senior standing or IC.

JRM 215. Media Literacy and Information Concepts. 2 credits. FA, SP, W

This introductory course explores the impact of media, digital communication and technology on journalism, public relations, advertising, design, computer science and society. Students will learn how technological changes continue to shape the future of mass communications and will explore various concepts including fake news, attention economy, online civic reasoning, data visualization, cyber security/privacy and cyber forensics.

JRM 315. Public Relations and Advertising Principles. 3 credits. FA

This is a collaborative, team-taught class that will incorporate half a semester each of PR Principles and Advertising Principles. In both you will learn about fundamental principles of persuasion, targeting, advocacy work and how these two distinct but related fields work with audiences.

JRM 319. Media Writing. 3 credits. FA, SP, SU

Students learn basic news writing forms and techniques and develop their interviewing and writing skills in gathering and writing news and feature stories for the student newspaper. The course also introduces students to ethical, legal and other issues surrounding the role of media in a democratic society. P. One Magis Core Contemporary Composition course.

JRM 320. Professional Writing. 3 credits. FA

This course will teach students how to write major professional formats such as executive summaries, power point presentations, abstracts of technical articles, professional proposals, copy for posters and copy for web pages. Course work will include oral presentations and integration of writing and graphics. P. Contemporary Composition course.

JRM 321. Advanced Reporting. 3 credits. OD

The advanced course builds on skills and concepts developed in JRM 319, Media Writing. Students research and write in-depth news articles for publication in campus media and beyond, focusing on specialized forms of reporting about government, business and politics. The course also emphasizes using computer tools, documents, data collection and analysis in the reporting. P. JRM 319.

JRM 322. Feature Writing. 3 credits. OD

The course explores the art of writing numerous types of features for newspapers and magazines including personality profiles, in-depth examinations of issues and problems, reviews, columns, editorials and humor. Course will stress research, writing and analytical skill development. Students also learn free-lance writing techniques and methods. P. JRM 319 or IC.

JRM 326. Sportswriting. 3 credits. OD

This in-depth course in the art of sportswriting provides students with experience in covering sports. The topics include how to interview coaches and players, how to obtain and report on sports statistics and how to write a variety of sports features incorporation multimedia. P. JRM 319.

JRM 327. Social Media. 3 credits. FA, SP

This course explores the development, art and practice of writing, editing and producing social media content over a range of platforms and networks in news, public relations and advertising. The course also will examine ethical and legal aspects of social media and its role in social justice.

JRM 331. Editing. 3 credits. FA

The course introduces students to the fundamentals of preparing copy for publication by emphasizing grammar, punctuation, style, consistency, clarity and accuracy. Students learn to work with writers, to write headlines and captions, to develop infographics and to be aware of ethical, legal and taste considerations when editing. P. JRM 319.

JRM 335. History of American Mass Media. 3 credits. FA, SP

This course explores the history of mass communication and mass media in America and its role in society-from the forerunners of the newspaper to current trends in digital media history and American political and social history are intertwined. Prereq: Critical Issues in Human Inquiry; Junior or Senior standing.

JRM 341. Public Relations Writing. 3 credits. FA

The course offers an in-depth examination and hands-on experience in the writing of various public relations formats including direct mail pieces, brochures, news releases, thought leadership blogs, speeches, grants and social media/website content. Students will also develop their editing skills. P. Sophomore standing or IC.

JRM 347. Advertising Campaigns I. 3 credits. FA

This course provides integrated and comprehensive experiences in advertising decision making. Experience gained in advertising principles, and advertising media writing is culminated in planning, executing and proposing a comprehensive advertising campaign. Working in teams, students will approach and solve advertising problems as an agency would for a client. May be repeated up to three times. P. JRM 315 or IC.

JRM 365. International Mass Communications. 3 credits. OD

The course examines the role of the mass media in an era of globalization and mass media's impact on societies throughout the world, emphasizing the issue of freedom of expression and of the press. The countries studied reflect areas of special contemporary interest.

JRM 419. Online Storytelling. 3 credits. SP

This course provides vital digital skills to future journalism and public relations professionals. As communication shifts online and to mobile platforms, this course places an emphasis on developing familiarity with multiple platforms and storytelling genres. Students will also learn the dynamics of data in augmenting storytelling and behavior tracking audience. P. JRM 319 OR JRM 320, GDE 324, Instructor consent.

JRM 433. Advertising Copy Writing. 3 credits. SP

The course explores techniques in writing advertising copy for all media using practical assignments. P. JRM 315.

JRM 438. Information Ethics. 3 credits. FA, SP, SU

This course explores the theoretical and practical ethical questions of mass communication as judged through the application of moral principles. Discussion of issues via case studies and simulation. P. One Magis Core Ethics course.

JRM 440. Media Research. 3 credits. FA, SP

This course is designed to teach students to conduct or understand research methods that are often used in the mass communication industry. Discussion covers and applies mass communication theories, sampling methodologies, statistical analysis, and interpretation of data. The course also introduces students to qualitative research methods common in mass communication research. P. Mathematical Reasoning course; Junior standing.

JRM 445. Public Relations Campaigns. 3 credits.

This course provides integrated and comprehensive experiences in integrated advertising and public relations decision making. Experience gained in JRM 315 is used to execute a comprehensive integrated public relations and advertising campaign. Prereq: JRM 315, Junior or Senior standing or Instructor Consent.

JRM 455. Projects in Communication. 1-3 credits. FA, SP, SU (Same as GDE 455)

Students develop a project in any of the mass media that is approved by a faculty member. The course may be repeated until a maximum of six credit hours have been accrued. Graded Satisfactory/Unsatisfactory. P. IC.

JRM 477. Advanced News Production. 1-3 credits. FA, SP

Students gain experience by working for one of the department's student media including The Creightonian or Creightonian Online. May be repeated for up to nine credit hours. P. IC.

JRM 479. Graphic Design Internship. 1-3 credits.

Students will gain professional experience in graphic design through working in supervised graphic design jobs. Graded Satisfactory/Unsatisfactory. P. GDE 380 and IC.

JRM 481. Broadcast and Video Internship. 1-3 credits.

Students gain professional experience through working for a radio, television or cable organization on a part-time basis for a semester or during an interterm period on a full-time basis. Graded Satisfactory/Unsatisfactory. P. IC.

JRM 483. Public Relations Internship. 1-3 credits. FA, SP, SU

Students gain professional experience by placement in a public relations department or agency on a part-time basis for one semester (or appropriate period during summer or interterm periods on either a full- or part-time basis) to learn how particular problems in public relations are handled and the methods used by that department or agency to communicate with its various publics. May be repeated. Graded Satisfactory/Unsatisfactory. P. IC.

JRM 485. News Internship. 1-3 credits. FA, SP, SU

Students gain professional experience with placement in news medium or agency on a part-time basis for one semester (or appropriate period during summer or interterm periods on either a full- or part-time basis) to gain practical experience in news gathering, writing and editing. May be repeated. Graded Satisfactory/Unsatisfactory. P. IC.

JRM 487. Advertising Internship. 1-3 credits. FA, SP, SU

Students gain professional experience by placement in a communications medium or agency on a part-time basis for one semester (or appropriate period during summer or interterm periods on either a full- or part-time basis) to gain practical experience in the procedures and functions of planning, preparing, placing and selling advertising messages and materials. May be repeated. Graded Satisfactory/Unsatisfactory. P. IC.

JRM 493. Directed Independent Readings. 1-3 credits. FA, SP, SU (Same as GDE 493)

Students work with a faculty member who agrees to supervise the directed independent readings. May be repeated until a maximum of six credit hours has been accrued. P. IC.

JRM 529. Law of Mass Communication. 3 credits. FA, SU

The course examines the legal limitations and privileges affecting publishing and broadcasting including libel, copyright, constitutional guarantees and restrictions on freedom of the press, the FCC, FTC, etc. P. Jr. stdg.

JRM 599. Senior Capstone: Entrepreneurial Media. 3 credits. FA

This project-based capstone is for journalism seniors in the news, advertising, public relations tracks. The course explores entrepreneurship and innovation in a media landscape that is constantly evolving. The course focuses on concepts of entrepreneurship and new media business models. Student research, design, and pitch an entrepreneurial idea that integrates content from their major courses with new content on entrepreneurship. P. Senior Standing; Oral Communication course.