

INTEGRATIVE MEDIA, B.A. - COGNATE MINOR IN COMPUTER SCIENCE

Recommended Course Sequence

First Semester	
[[BA-153]] Management Foundations	3
[[CS-125]] Computer Science I	4
[[ART-111]] Fundamentals of Color & Design	3
Distribution Requirement	3
[[FYF-101]] First-Year Foundations	3
Total Credits	16

Second Semester	
[[CS-126]] Computer Science II	4
Distribution Requirements	6
[[ENG-101]] Composition	4
[[IM-101]] Integrative Media Foundation I	3
Total Credits	17

Third Semester	
[[CS-225]] Computer Science III	3
Distribution Requirement	3
Elective	3
[[ENT-203]] Opportunity Identification	3
[[IM-201]] Integrative Media Foundations II	3
Total Credits	15

Fourth Semester	
[[COM-102]] Principles of Communication	3
[[CS-226]] Computer Science IV	3
Distribution Requirement	3
[[ENG-202]] Technical & Professional Writing	3
[[IM-301]] Principles of Motion & Layering	3
Total Credits	15

Fifth Semester	
[[CS-283]] Web Development I	3
Distribution Requirement	3
Elective	3

[[IM-302]] Principles of Interactivity	3
[[IM-320]] Concept Development & Processes	3
Total Credits	15

Sixth Semester	
[[CS-325]] Database Management	3
Distribution Requirement	3
Electives	6
[[IM-391]] Integrative Media Project I	3
Total Credits	15

Seventh Semester	
[[CS-383]] Web Development II	3
Electives	6 - 9
[[IM-392]] Integrative Media Project II	3
[[IM-399]] Cooperative Education	0 - 3
Total Credits	12 - 18

Eighth Semester	
Electives	9 - 12
[[IM-399]] Cooperative Education	0 - 3
[[IM-400]] Integrative Media Portfolio Capstone	3
Total Credits	12 - 18

IM. INTEGRATIVE MEDIA

IM-198/289/398. TOPICS IN INTEGRATED MEDIA

Credits: Varies with topic.

A study of topics of special interest not extensively treated in regularly offered courses.

[Click here for course fee.](#)

IM-101. INTEGRATIVE MEDIA FOUNDATIONS I

Credits: 3

This course is an introduction and multiple media survey of artists, styles, and techniques influential in the development of contemporary media. Through this exposure and readings, a creative process will be developed and absorption will stimulate, motivate, and inspire a personal aesthetic vision. In addition, through intensive thought, analysis, and critique, we will explore media as it affects our society and our responsibility as media content generators.

[Click here for course fees.](#)

IM-120. FOUNDATIONS OF GAME DESIGN

Credits: 3

This course provides an introductory overview of the video game design by focusing on development principles, techniques, process, and tools. Students will explore and investigate the history and evolution of video games and a variety of game genres. Students will also learn team collaboration as well as using game development software to create simple conceptual prototypes during the course.

Pre-Requisites

None

IM-201. INTEGRATIVE MEDIA FOUNDATIONS II

Credits: 3

This course is an introduction to the foundational design principles as they apply to digital new media applications. Students will produce digital projects through the introductory application of various digital tools with a continued focus on the constant evolution of a personal aesthetic vision. A survey of new media applications, terminology, and techniques will be researched and discussed, along with our responsibility as communicators to mass media markets.

[Click here for course fees.](#)

Pre-Requisites

[[IM-101]].

IM-210. INTRODUCTION TO GAME DEVELOPMENT (2D)

Credits: 3

A project-based course emphasizes applying game design principles to produce interactive visual storytelling and simple 2D games. Students will learn basic coding, 2D animation and physics, and be introduced to a variety of game engines to create fun and interactive games through the coursework.

Pre-Requisites

[[IM-120]]
[[CS-125]]

IM-240. CROSS-MEDIA TYPOGRAPHY

Credits: 3

This course takes a critical look at type and its proper usage in multiple forms of media. In addition to type identification and usage, we will take a critical look at seminal works of typography and understand their impact and effectiveness. This course is offered in the Spring semester of each academic year.

Pre-Requisites

[[IM-101]]

IM-255. INTEGRATIVE MEDIA PRACTICUM

Credits: 1-2

The Department Practicum may be taken for one to two credits per semester. Students may earn credit for major roles and positions of major responsibility in the co-curricular activities in the Creative Production Studio, Studio 020. Credit for participation in these activities is optional, and voluntary participation (without credit) is also encouraged. The department, through the advisor or instructor of the activity, has the authority to approve or reject any contract for credit under this designation. Credits earned are applicable toward graduation, but do not count toward the requirements of the IM core. Written approval for credit must be by advisor or department chairperson.

IM-301. INTEGRATIVE MEDIA PRINCIPLES OF MOTION AND LAYERING

Credits: 3

This course will address the foundational concepts of assembling digital imagery, relational to short format projects, focusing on historical and contemporary principles of montage, timing, and pacing. In addition, the technical and aesthetic principles of compositing will be covered producing multi-layered projects for a variety of media.

[Click here for course fees.](#)

Pre-Requisites

[[IM-201]].

IM-302. INTEGRATIVE MEDIA PRINCIPLES OF INTERACTIVITY

Credits: 3

Technical and aesthetic principles of interactivity will be conveyed and practiced to produce a range of interactive media. Addressing issues of human static and dynamic interactive ergonomics as they apply to contemporary commercial and artistic applications.

[Click here for course fees.](#)

Pre-Requisites

[[IM-201]].

IM-303. ADVANCED PRINCIPLES OF INTERACTIVITY

Credits: 3

This course will explore advanced functions of the 3 Dimensional animation processes as they apply to a variety of media applications. Students will build computer-based models and environments; texture, light and animate as appropriate and efficiently render as content for 3D projects or as stand-alone pieces. Students will develop creative self-directed developmental techniques through introduction to animation programming and applications.

Pre-Requisites

[[IM-302]]

IM-304. 2D APP DEVELOPMENT

Credits: 3

This course will explore advanced functions of the 3 Dimensional animation processes as they apply to a variety of media applications. Students will build computer-based models and environments; texture, light and animate as appropriate and efficiently render as content for 3D projects or as stand-alone pieces. Students will develop creative self-directed developmental techniques through introduction to animation programming and applications.

Pre-Requisites

[[IM-302]]

IM-310. ADVANCED GAME DEVELOPMENT (3D)

Credits: 3

A design studio course focusing on industry processes and 3D interactive game development from start to finish using program languages. The developed games can run on a variety of platforms such as desktops, mobiles, and AR/VR devices. This course also provides students with insights on not only creating games, but also using the game development pipeline to solve real-world simulation and visualization problems.

Pre-Requisites

[[IM-210]]

[[IM-350]]

[[IM-368]]

IM-320. INTEGRATIVE MEDIA CONCEPT DEVELOPMENT AND PRACTICES

Credits: 3

Through research, writing, and example, students will gain an advanced understanding of the creative generating processes in a new media environment. These processes will be used to formulate solid, cohesive concepts and present storyboards that are visually communicative and professional. With discussion, critique, and reiteration, the concepts are refined and reinforced.

[Click here for course fees.](#)

Pre-Requisites

[[IM-201]].

IM-330. VIRTUAL ENVIRONMENTS AND EMERGENT TECHNOLOGY

Credits: 3

An introductory project-based course exposing the principles of virtual/augmented reality technologies including displays, tracking, and major hardware platforms and their capabilities.

This course also prepares students to utilize these technologies to create interactive content and artworks.

Pre-Requisites

[[IM-210]]

[[IM-350]]

[[IM-368]]

IM-341. CROSS-MEDIA TYPOGRAPHY II

Credits: 3

Cross-Media Typography II is a semester-long intensive project-generating course that employs typographic concepts discussed in Cross-Media Typography I. Each project is meant to explore further applications of type as art, as well as type in professional practice. The course is a combination of in-class studio work and independent research on portfolio-quality projects. It will be offered in the spring semester each academic year.

Pre-Requisites

[[IM-240]]

IM-350. 3 DIMENSIONAL ENVIRONMENTS AND ANIMATION

Credits: 3

This course will explore the foundations of 3-dimensional animation processes as they apply to multiple media. Students will build computer-based models and environments, texture, light, animate, and render content for Integrative Media projects, stand-alone projects of 3-D foundations used within the CS gaming track. (Cross-listed with [[CS-350]].)

[Click here for course fees.](#)

Pre-Requisites

IM students—IM 301; CS students—CS 125.

IM-351. 3D ENVIRONMENTS & ANIMATION II

Credits: 3

This course will explore advanced functions of the 3 Dimensional animation processes as they apply to gaming. Students will build computer-based models and environments; subsequently, texture, light, animate as appropriate and efficiently render as content for 3D gaming projects or as stand-alone pieces.

Pre-Requisites

[[IM-350]] OR [[CS-366]]

IM-355. DIGITAL AUDIO PRINCIPLES AND EDITING

Credits: 3

The foundational concepts behind music theory, sound design, and digital studio editing techniques will be addressed in this course. This knowledge can then be applied to creating and adapting sound components for use within the variety of Integrative Media projects.

[Click here for course fees.](#)

Pre-Requisites

[[IM-201]].

IM-368. 3D ASSETS MODELING AND DEVELOPMENT

Credits: 3

An overview of simulation, engine-based, and real-time game systems with a focus on theory, creation, and animation of three-dimensional models used within a game context using industry-standard software. Cross-listed with [[CS-368]].

[Click here for course fees.](#)

Pre-Requisites

[[IM-350]] , [[CS-366]] or [[CS-367]].

IM-391. INTEGRATIVE MEDIA PROJECT I

Credits: 3

This project-based course will begin to assemble production teams to produce project(s) from concept to completion. Students will develop storyboards and, through creative and organizational work sessions, define a completion plan and production schedule. All phases of the production process will be addressed under creative, financial, and deadline benchmarks. Note: This course must be completed with a minimum final grade of 25 in order to meet degree requirements

[Click here for course fees.](#)

Pre-Requisites

[[IM-320]].

IM-392. INTEGRATIVE MEDIA PROJECT II

Credits: 3

Students will initiate new or continue team-oriented integrative media productions. The production process will be optimized to continue the experience of industry scenarios. Expanded business practices and production techniques will build upon prior skill sets. Note: This course must be completed with a minimum final grade of 25 in order to meet degree requirements

[Click here for course fees.](#)

Pre-Requisites

[[IM-391]].

IM-399. COOPERATIVE EDUCATION

Credits: 1-6

Pre-Requisites

Sophomore standing, minimum 2.0 cumulative GPA, consent of academic advisor, and approval of placement by the department chairperson.

IM-400. INTEGRATIVE MEDIA PORTFOLIO CAPSTONE

Credits: 3

As the capstone of the IM curriculum, this course will focus on the compilation of visual materials produced throughout the set of courses, as necessary in the job submission process. Creating a self 'brand' will be a concentration, along with the compilation of written works, flatbook, and reel. Understanding the perspective of the employer will be heavily discussed and the various positions, procedures, and environments that produce IM products. Note: This course must be completed with a minimum final grade of 25 in order to meet degree requirements.

[Click here for course fees.](#)

Pre-Requisites

[[IM-391]].

CS. COMPUTER SCIENCE

CS-198, CS-298, CS-398. TOPICS IN COMPUTER SCIENCE

Credits: Variable

Study of one or more special topics in computer science. May be repeated for credit if different topics are emphasized. Offered when demand warrants.

Pre-Requisites

Varies with topic

CS-115. COMPUTERS AND APPLICATIONS

Credits: 3

An introduction to computers and computing, with emphasis on personal computing in both the Windows and OS X operating systems. Extensive hands-on experience will involve the application of current commercial software (including word processing, database, and spreadsheet). Not open to students who have received credit in any 200-level CS course. Students majoring in either Computer Science or Computer Information Systems will not receive credit for this course.

CS-125. COMPUTER SCIENCE I

Credits: 4

Introduction to information technology and programming (history of computing, text editors, word processing, spreadsheets, introduction to programming), basic data types, functions, decision structures, loops, one- and two-dimensional list structures, testing, debugging, and an introduction to computer graphics. Three hours of lecture and two hours of lab per week. Offered every fall and spring.

[Click here for course fee.](#)

Co-Requisites

[[MTH-100]] or higher

CS-126. COMPUTER SCIENCE II

Credits: 4

A study of advanced programming concepts, structures, and techniques (professional and ethical issues, testing and debugging, fundamentals of programming, basic data structures—strings, lists, multidimensional arrays, objects, hashes, inheritance, polymorphism, recursion, divide and conquer, machine representation of data, hardware components, machine instructions). Three hours of lecture and two hours of lab per week. Offered every fall and spring.

[Click here for course fee.](#)

Pre-Requisites

[[CS-125]] with grade of 2.0 or better OR equivalent programming experience.

CS-225. COMPUTER SCIENCE III

Credits: 3

A study of the use of a high-level language to implement basic data structures such as strings, lists, arrays, objects, and hashes, and their application to searching, sorting, and hashing. Representation of numbers and strings at the machine level. The course will also include an introduction to the concepts of algorithm design and problem solving with an emphasis on algorithm development, analysis, and refinement. Offered every fall.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]] with grade of 2.0 or better

CS-226. COMPUTER SCIENCE IV

Credits: 3

A continuation of [[CS-225]]. Topics include programming language paradigms, advanced use of word processors and spreadsheets, including macros, linked data structures, and an introduction to discrete mathematics, including counting, probability, and graphs. Offered every spring.

[Click here for course fee.](#)

Pre-Requisites

[[CS-225]] with grade of 2.0 or better

CS-246. C AND UNIX

Credits: 3

An introduction to using Unix operating systems, including shells, file manipulation, text editors, filters, and regular expressions. Fundamentals of C programming, including loops, arrays, functions, recursion, pointers, structures, unions, input/output, and system calls.

[Click here for course fee.](#)

Pre-Requisites

[[CS-125]] with grade of 2.0 or better

CS-265. MEDICAL INFORMATICS

Credits: 3

This course will cover basic principles of computer use and information management in health care (including general medicine, dentistry, optometry, and pharmacy). Topics will include basic computing concepts, the characteristics of medical data, and the use of computers in the administrative, diagnostic, and research oriented medical tasks. The course is primarily directed towards students who intend to pursue careers in health-related fields. Offered every spring.

[Click here for course fee.](#)

CS-283. WEB DEVELOPMENT I

Credits: 3

An introduction to the development of interactive web sites, including HTML, JavaScript, forms and CGI programs; server side includes cookies, web server configuration and maintenance. Offered in the fall semester of odd-numbered years when demand warrants.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]].

CS-285. MOBILE APPLICATIONS

Credits: 3

An introduction to programming mobile application development. Topics will include cross-platform development; user interface design; touchscreen, GPS, and motion sensing input; memory management; cloud services and network utilization; security and trust considerations; data privacy and ethics.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]] and [[CS-246]].

CS-317. SOFTWARE INTEGRATION

Credits: 3

An introduction to the integration of application programs, including email clients, word processors, spreadsheets, and database systems using Microsoft Office and Visual Basic.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]].

CS-319. PRINCIPLES OF PROGRAMMING LANGUAGES

Credits: 3

A study of the principles that govern the design and implementation of programming languages. Topics include language structure, data types, and control structures. Programming projects will familiarize students with features of programming languages through their implementation in interpreters.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-321. SIMULATION AND DATA ANALYSIS

Credits: 3

Methods of handling large databases, including statistical analysis and computer simulations. The emphasis will be upon discrete simulation models with a discussion of relevant computer languages: ARENA, GPSS, and SIMSCRIPT.

[Click here for course fee.](#)

Pre-Requisites

[[CS-125]] and [[MTH-111]].

CS-323. THEORY OF COMPUTATION

Credits: 3

This course formalizes many topics encountered in previous computing courses. Topics include languages, grammars, finite automata, regular expressions and grammars, context-free languages, push-down automata, Turing machines, and computability.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]] and [[MTH-231]].

CS-324. SYSTEMS ANALYSIS

Credits: 3

Fees:

A study of the design and implementation of large computer projects. Special emphasis is placed on applications to business systems. Students will use a CASE tool for automated systems analysis and design.

[Click here for course fee.](#)

Pre-Requisites

[[CS-225]].

CS-325. DATABASE MANAGEMENT

Credits: 3

Terms Offered: Winter

Practical experience involving the fundamental concepts of database systems including data modeling; query languages; database management system implementation; management of semi-structured and multimedia data; distributed and noSQL databases

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]].

CS-326. OPERATING SYSTEM PRINCIPLES

Credits: 3

Analysis of the computer operating systems, including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-327. COMPILER DESIGN

Credits: 3

A study of compiler design, including language definition, syntactic analysis, lexical analysis, storage allocation, error detection and recovery, code generation, and optimization problems.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-328. ALGORITHMS

Credits: 3

Theoretical analysis of various algorithms. Topics are chosen from sorting, searching, selection, matrix multiplication of real numbers, and various combinatorial algorithms.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]] and [[MTH-232]].

CS-330. COMPUTER ARCHITECTURE

Credits: 3

A study of the design, organization, and structure of computers, ranging from the microprocessors to the latest 'supercomputers.' An emphasis will be placed on machine language, instruction formats, addressing modes, and machine representation of numbers.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-334. SOFTWARE ENGINEERING

Credits: 3

A course in 'programming in the large.' Topics include software design, implementation, validation, maintenance, and documentation. There will be one or more team projects.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-335. DATA SCIENCE AND INFORMATION RETRIEVAL

Credits: 3

Practical experience involving unstructured data collections. Topics cover big data, data mining, predictive modeling, decision analysis and indexing and retrieval including probabilistics, clustering, thesauri and passage based retrieval strategies.

[Click here for course fee.](#)

Pre-Requisites

[[CS-325]] or [[CS-340]]

CS-340. ARTIFICIAL INTELLIGENCE

Credits: 3

This course will provide an overview of artificial intelligence (AI) application areas and hands-on experience with some common AI computational tools. Topics include search, natural language processing, theorem proving, planning, machine learning, robotics, vision, knowledge-based systems (expert systems), and neural networks.

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]].

CS-350. OBJECT-ORIENTED PROGRAMMING

Credits: 3

Object-oriented concepts and their application to human-computer interaction. Concepts to be covered include objects, classes, inheritance, polymorphism, design patterns, GUI interface guidelines, and design of interfaces. There will be programming projects in one or more object-oriented languages using one or more GUI interface guidelines.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-355. COMPUTER NETWORKS

Credits: 3

This course introduces basic concepts, architecture, and widely used protocols of computer networks. Topics include the Open System Interconnection (OSI) model consisting of physical link layer, data layer, network layer, transport layer, session layer, presentation layer, and application layer, the medium access sublayer and LAN, various routing protocols, Transmission Control Protocol (TCP), and Internet Protocol (IP) for internetworking.

[Click here for course fee.](#)

Pre-Requisites

[[CS-225]] and [[CS-246]]

CS-363. OPERATIONS RESEARCH

Credits: 3

A survey of operations research topics such as decision analysis, inventory models, queuing models, dynamic programming, network models and linear programming. Cross-listed with [[MTH-363]].

[Click here for course fee.](#)

Pre-Requisites

[[CS-125]], and [[MTH-111]].

CS-364. NUMERICAL ANALYSIS

Credits: 3

An introduction to numerical algorithms as tools to providing solutions to common problems formulated in mathematics, science, and engineering. Focus is given to developing the basic understanding of the construction of numerical algorithms, their applicability, and their limitations. Cross-listed with [[MTH-364]]. Offered Spring odd years.

Pre-Requisites

[[MTH-211]] and [[CS-125]] (or equivalent programming experience).

CS-366. 3 DIMENSIONAL ENVIRONMENTS AND ANIMATION

Credits: 3

This course will explore the foundations of 3-dimensional animation processes as they apply to multiple mediums. Students will build computer-based models and environments, texture, light, animate, and render content for Integrative Media projects or as stand-alone pieces. Cross-listed with [[IM-350]].

[Click here for course fee.](#)

Pre-Requisites

[[CS-126]] or [[IM-201]].

CS-367. COMPUTER GRAPHICS

Credits: 3

Fees:

Introduction to equipment and techniques used to generate graphical representation by computer. Discussion of the mathematical techniques necessary to draw objects in two- and three-dimensional space. Emphasis on application programming and the use of a high-resolution color raster display.

[Click here for course fee.](#)

Pre-Requisites

[[CS-226]].

CS-368. 3 DIMENSIONAL GAME DEVELOPMENT

Credits: 3

An overview of simulation, engine-based, and real-time game systems with a focus on theory, creation, and animation of three-dimensional models used within a game context. Cross-listed with [[IM-368]].

[Click here for course fee.](#)

Pre-Requisites

[[CS-366]]/IM 350 or [[CS-367]].

CS-370. SPECIAL PROJECTS

Credits: variable

Requirements: Senior standing and approval of the department chairperson.

CS-383. WEB DEVELOPMENT II

Credits: 3

An introduction to the development of dynamic, database-driven sites, including active server pages, PHP, authentication, session tracking and security, and the development of shopping cart and portal systems.

[Click here for course fee.](#)

Pre-Requisites

[[CS-283]]. [[CS-325]].

CS-391. SENIOR PROJECTS I

Credits: 1

Design and implementation of a software project under the direction of a faculty member. Students will normally work in teams. Detailed requirements and design documents are required and will be presented at the end of the semester. Offered every fall.

[Click here for course fee.](#)

Pre-Requisites

[[CS-334]] or [[CS-324]].

CS-392. SENIOR PROJECTS II

Credits: 2

Design and implementation of a software project under the direction of a faculty member. Students will normally work in teams. Production of a finished product, including software and documentation, is required. There will be an open forum presentation of the project at the end of the semester. Offered every spring.

[Click here for course fee.](#)

Pre-Requisites

[[CS-391]].

CS-399. COOPERATIVE EDUCATION

Credits: 1-6

Professional cooperative education placement in a private or public organization related to the student's academic objectives and career goals. In addition to their work experiences, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. See the Cooperative Education section of this bulletin for placement procedures. Requirements: Sophomore standing; minimum 2.0 cumulative GPA; consent of the academic advisor; and approval of placement by the department chairperson.