Spring 2185 Semester Enrollment Guide
Game Design and Development

Table of Contents

1 What courses should I take? ........................................................................................................... 1
2 IGM Students Taking (or who will take) 105, 106, and 202 ......................................................... 1
3 How do I search for courses? ........................................................................................................ 2
4 Co-op and Career Skills Preparation .......................................................................................... 3
5 IGME Spring Semester Core Course Descriptions ........................................................................ 3
   5.1 Reminders ............................................................................................................................. 3
   5.2 Descriptions .......................................................................................................................... 3
6 Game Design and Development Advanced Elective Courses .......................................................... 7
   6.1 Policies .................................................................................................................................... 7
   6.2 Descriptions .......................................................................................................................... 7
7 IGM Undergraduate Advanced Elective Project Classes ................................................................. 10
   7.1 Course Listings ....................................................................................................................... 12
   7.2 Production/Research Studio FAQ .......................................................................................... 12
   7.3 Independent Study FAQ ......................................................................................................... 12
8 Who to Contact ............................................................................................................................. 13

1 What courses should I take?

Students who entered Fall 2017: by now, you should have attended a mandatory advising group meeting in which you worked out a plan for the Fall semester. If you did not attend a meeting, please schedule through Starfish (refer to e-mails from your advisor about this meeting). Please use your program worksheet that was given to you at Orientation as well as the Academic Advising Report (AAR) on SIS to plan your schedule.

Students who entered RIT before Fall 2017: you need to follow your program worksheet and/or the Individualized Advising Plan (IAP). The IAP was drafted four or more years ago specifically for each student who enrolled in classes during the quarter and semester calendars and was discussed with you during an appointment with your advisor. Note: your IAP is “one, suggested path to degree completion.”
You should be aware that if you have deviated from the path outlined by your academic advisor, it may impact your ability to graduate in the timeframe that was outlined for you.

Students who entered RIT in (or before) Fall 2012:

- If you have an *Arts of Expression* course left to complete, you may enroll in a General Education Elective (any Math, Science, or Liberal Arts course coded as a General Education course).
- If you are required to complete a *foundational elective*, you may enroll in a General Education Elective (any Math, Science, or Liberal Arts course coded as a General Education course) to fulfill this requirement.

Students who entered RIT in Fall 2013:

- First Year Seminar: take a General Education Elective (any Math, Science, or Liberal Arts course coded as a General Education course).

2  **IGM Students Taking (or who will take) 106, 202 and 209**

The following IGM courses, IGME-106, IGME-202 and IGME-209, have grade pre-requisites which SIS shows. If you earn a D or lower in a course that is a pre-requisite to one of those courses, you must retake the pre-requisite course. Here are the complete grade pre-requisites:

- If you earn a grade of D or lower in IGME-105, you cannot take IGME-106.
- If you earn a grade of D or lower in IGME-106, you cannot take IGME-202.
- If you earn a grade of D or lower in IGME-106, you cannot take IGME-209.

Please check with your academic advisor if you have any questions.

3  **How do I search for courses?**

**Searching for all courses:** see [https://sis.rit.edu](https://sis.rit.edu) or [https://tigercenter.rit.edu](https://tigercenter.rit.edu). All courses are coded with 4 letter subject codes. Courses offered by IGM are listed as IGME courses.

**General Enrollment Questions:** For more information regarding how to use SIS for Enrollment please view [https://www.rit.edu/gccis/igm/academic-resources](https://www.rit.edu/gccis/igm/academic-resources).

**Arts & Science Perspectives:** To search for these courses please follow these instructions:

1. Log into [https://sis.rit.edu](https://sis.rit.edu).
2. Select Student Info System.
3. Click on Student Center.
4. Click **Search For Classes** button on the right.
5. Change the **Term** menu to the term you wish to look for courses.
6. Use Course Career menu to select Undergraduate.
7. Change course number to Greater than or equal to.
8. Enter the number 1 in the course field.
9. To see all options, uncheck **Show Open Classes**.
10. In the course attribute field, enter **PERS**.
11. Select the perspective you wish to search by clicking on the magnifying glass under course attribute value.
12. Click **Search**. This list displays all scheduled open and closed General Education classes for the perspective you chose.
13. To add a class to your shopping cart, click **Select**.

**Tiger Center:** A new class search tool developed by RIT students in partnership with ITS is now available. Tiger Center has the same functionality as SIS but may be more intuitive when searching for classes. [https://classsearch.rit.edu/classSearch/home#/search](https://classsearch.rit.edu/classSearch/home#/search).

### 4 Co-op and Career Skills Preparation

In spring semester, IGM will once again offer IGME-099: Co-op Preparation, which targets second-year students. This course is required for all Game Design & Development students who started in Fall 2015 and later. This course helps students prepare for co-operative education employment (“co-op”) by developing job search strategies and material. Students will explore current and emerging aspects of IGM fields to help focus their skill development strategies. Students are introduced to RIT’s Office of Career Services and Cooperative Education and learn about professional and ethical responsibilities for their co-op and subsequent professional experiences. Students will work collaboratively to build résumés and digital portfolios, and to prepare for interview situations.

The course will be offered Wednesdays from 3:00 PM – 3:50 PM in GOL-1400. Students can enroll through SIS or Tiger Center.

### 5 IGME Spring Semester Core Course Descriptions

#### 5.1 Reminders

These courses are offered in spring semester and are required (eventually) of all GD&D majors. They are listed in numerical order. Any prerequisites for a course are listed in parentheses with quarter “equivalents” for those prerequisites [*between square brackets*]. Note that the quarter prerequisite courses are not necessarily equivalent to the corresponding semester courses—material from the quarter curriculum has been updated and repackaged under semesters. So, the quarter prerequisite courses listed encompass the necessary material for each semester course.

Remember that **4080-XYZ** indicates courses under the quarter system, whereas **IGME-ABC** indicates courses under the semester system.

#### 5.2 Descriptions

**IGME-99 Co-op Preparation Workshop** (0 credits):
This course helps students prepare for co-operative education employment (“co-op”) by developing job search strategies and material. Students will explore current and emerging aspects of IGM fields to help focus their skill development strategies. Students are introduced to RIT’s Office of Cooperative Education and Career Services, and learn about professional and ethical responsibilities for their co-op and subsequent professional experiences. Students will work collaboratively to build résumés and digital portfolios, and to prepare for interview situations.

The course will be offered Wednesdays from 3:00 PM – 3:50 PM in GOL-1400. Students who started in Game Design & Development in fall 2015 and later are required to take this course. Ideally, a student will take this course in their second year. Students can enroll in the class through SIS or Tiger Center. This class covers the mandatory co-op orientation normally held for IGM students.
IGME-105  Game Development and Algorithmic Problem Solving I (4 credits): This course, along with IGME-106 are the semester equivalents of 4080-221, 222, and 223 (the GSD programming sequence). If you have completed both 4080-221 and 222, don’t enroll in IGME 105—take IGME 106 instead.

This course introduces students within the domain of game design and development to the fundamentals of computing through problem solving, abstraction, and algorithmic design. Students will learn the basic elements of game software development, including problem decomposition, the design and implementation of game applications, and the testing/debugging of their designs.

IGME-106  Game Development and Algorithmic Problem Solving II (4 credits): This course, along with IGME-105 are the semester equivalents of 4080-221, 222, and 223 (the GSD programming sequence). So, if you have completed 4080-223, don’t enroll in IGME-106. If you have completed both 4080-221 and 222 but not 223, enroll in IGME-106.

This course furthers the exploration of problem solving, abstraction, and algorithmic design. Students apply the object-oriented paradigm of software development, with emphasis upon fundamental concepts of encapsulation, inheritance, and polymorphism. In addition, object structures and class relationships comprise a key portion of the analytical process including the exploration of problem structure and refactoring. Intermediate concepts in software design including GUIs, threads, events, networking, and advanced APIs are also explored. Students are also introduced to data structures, algorithms, exception handling and design patterns that are relevant to the construction of game systems. (C- or better in IGME-105 Game Development and Algorithmic Problem Solving I [4080-221 & 222])

IGME-110  Introduction to Interactive Media (3 credits): This course is the semester “equivalent” of 4080-295, so if you’ve completed 4080-295, don’t enroll in IGME-110.

This course provides an overview of media in historical, current and future contexts. Incorporating lectures and discussion with hands on work involving written and interactive media assets, students examine the role of written and visual media from theoretical as well as practical perspectives. The course also provides an introduction to interactive media development techniques, including digital media components and delivery environments. Students will be required to write formal analysis and critique papers along with digital modes of writing including collaborative editing and effective presentation design. (None)

IGME-119  2D Animation & Asset Production (3 credits): This course combines material from 4080-346 and 347. If you have completed 4080-346, do not enroll in IGME-119. If you have completed 4080-347 but not 346, enroll in IGME 119.

This course provides a theoretical framework covering the principles of animation and its use in game design to affect user experience. Emphasis will be placed upon principles that support character development and animations that show cause and effect. Students will apply these principles to create animations that reflect movement and character appropriate for different uses and environments. (IGME-110 Introduction to Interactive Media [4080-295])

IGME-202  Interactive Media Development (3 credits): This course repackages material from 4080-330 and 4080-434 (Interactive Digital Media and Programming for Digital Media). If you have completed 4080-330, do not enroll in IGME 202.

In this course, students will learn to create visually rich interactive experiences. It is a course in programming graphics and media, but it is also a course on the relationship between ideas and code. Students will explore topics in math and physics by building programs that simulate and visualize processes in the natural world. Assignments will include major programming projects, such as building a virtual world inhabited by digital creatures that display observable behaviors. (C- or better in IGME-201 New Media
IGME-209 Data Structures & Algorithms for Games & Simulations I (3 credits): This course is the semester “equivalent” of 4080-387 Data Structures and Algorithms I. If you have completed 4080-387, do not enroll in IGME-209.

This course focuses upon the application of data structures, algorithms, and fundamental Newtonian physics to the development of video game applications, entertainment software titles, and simulations. Topics covered include 3D coordinate systems and the implementation of affine transformations, geometric primitives, and efficient data structures and algorithms for real-time collision detection. Furthermore, Newtonian mechanics principles will be examined in the context of developing game and entertainment software where they will be applied to compute the position, velocity and acceleration of a point-mass subject to forces and the conservation of momentum and energy. Programming assignments are a required part of this course. ((C- or better in IGME 106 Game Development and Algorithmic Problem Solving II [4080-223] or IGME 201 New Media Interactive Design and Algorithmic Problem Solving III [4080-333]) and PHYS-111 College Physics I [1017-211], and MATH-185 Mathematics of Graphical Simulation I [1016-206])

IGME-219 3D Animation & Asset Production (3 credits): This course is the semester “equivalent” of 4080-347 3D Animation. If you have completed 4080-347, you do not enroll in IGME-219. If you have completed 4080-346 but not 347, enroll in IGME-219.

This course provides an overview of 3D game asset production. Basic ideas learned within the first asset production course are also revisited within the 3D environs. Topics covered include modeling, texturing, skinning and animation. Emphasis is put on low polygon modeling techniques, best practices in game art production, and effective communication strategies between artists, programmers and designers. (IGME-119 2D Animation & Asset Production [4080-346])

IGME-220 Game Design & Development I (3 credits): This course is the semester “equivalent” of 4080-380 Game Design and Development Fundamentals I. If you have completed 4080-380, do not enroll in IGME-220.

This course examines the core process of game design, from ideation and structured brainstorming in an entertainment technology context through the examination of industry standard processes and techniques for documenting and managing the design process. This course specifically examines techniques for assessing and quantifying the validity of a given design, for managing innovation and creativity in a game development-specific context, and for world and character design. Specific emphasis is placed on both the examination and deconstruction of historical successes and failures, along with presentation of ethical and cultural issues related to the design and development of interactive software and the role of individuals in a team-oriented design methodology. Students in this class are expected to actively participate and engage in the culture of design and critique as it relates to the field. (GAMEDES-BS and NWMEDID-BS students in year levels 2-5).

IGME-230 Website Design & Implementation (3 credits): This course is the semester “equivalent” of 4080-309 (Introduction to Web Development), but it will include server-side programming, which is “new” material. If you have completed 4080-309, do not enroll in IGME-230.

This course provides an introduction to web development tools and technologies, such as X/HTML, CSS, JavaScript and DHTML, AJAX, web platforms and environments, and server-side programming methods. (IGME-102 New Media Interactive Design and Algorithmic Problem Solving II [4080-231] or IGME-106 Interactive Design and Algorithmic Problem Solving III [4080-333] or IGME-106 Game Development and Algorithmic Problem Solving II [4080-223]) & MATH-185 Math of Graphical Simulation I)
Game Development and Algorithmic Problem Solving II [4080-223], and IGME-110 Introduction to Interactive Media [4080-295])

IGME-236  Interaction, Immersion, & the Media Interface (3 credits): This is a new course that replaces 4002-425 Human Computer Interaction I, which was offered by the Department of Information Sciences and Technology. It also replaces 4080-323 Design of the Graphical User Interface in the New Media program.  If you have completed 4002-425 or 4080-323, you should not enroll in IGME 236.

This course examines the concepts of interface and interaction models in a media-specific context, with particular emphasis on the concept of the immersive interface. This course explores concepts such as perception, expectation, Gestalt Theory, interactivity, Semiotics, presence, and immersion in the context of media application development and deployment. In addition, underlying concepts of cognitive psychology and cognitive science will be integrated where appropriate. These theories are then integrated in the exploration of the immersive interface, and with related concepts such as user-level-interface modification, augmentation of identity, and the interface as a social catalyst. (IGME-102 New Media Interactive Design and Algorithmic Problem Solving II [4080-231] or IGME-106 Game Development and Algorithmic Problem Solving II [4080-223], and IGME-110 Introduction to Interactive Media [4080-295])

IGME-309  Data Structures & Algorithms for Games & Simulations II (3 credits): This course is the semester “equivalent” of 4080-487 (Data Structures and Algorithms II). If you have completed 4080-487, do not enroll in IGME-309. If you have completed 4080-387 but not 487, enroll in IGME-309.

This course continues the investigation into the application of data structures, algorithms, and fundamental Newtonian mechanics required for the development of video game applications, simulations, and entertainment software titles. Topics covered include quaternion representation of orientation and displacement, cubic curves and surfaces, classifiers, recursive generation of geometric structures, texture mapping, and the implementation of algorithms within game physics engines for collision detection and collision resolution of rigid bodies, and the numerical integration of the equations of motion. In addition, advanced data structures such as B+ trees and graphs will be investigated from the context of game application and entertainment software development. Programming assignments are a requirement for this course. (IGME-209 Data Structures & Algorithms for Games & Simulations I [4080-387] and (MATH 171 Calculus A or MATH 181 Project Based Calculus I or MATH 181A Calculus I or MATH-186 Mathematics of Graphical Simulation II [1016-228 or 1016-282])

IGME-320  Game Design & Development II (3 credits): This course is the semester “equivalent” of 4080-381 (Game Design and Development Fundamentals II). If you have completed 4080-380, but not 381, enroll in IGME-320.

This course continues to examine the core theories of game design as they relate to the professional field. Beginning with a formalized pitch process, this course examines the design and development paradigm from storyboarding and pre-visualization through rapid iteration, refinement, and structured prototyping exercises to further examine the validity of a given design. Specific emphasis is placed on iterative prototyping models, and on methodologies for both informal and formal critique. This course also explores production techniques and lifecycle in the professional industry. (IGME 202 Interactive Media Development [4080-330] and IGME-220 Game Design & Development I [4080-380])

IGME-330  Rich Media Web Application Development I (3 credits): This is a new course that presents material from 4080-431 Introduction to Web Technologies and 4080-432 New Media Web Technologies II. If you have completed 4080-432, you should not enroll in IGME-330. If you completed 4002-360 Database and Data Modeling under quarters, IGME-330 could count as an Advanced Elective. If you were a first year student who in Fall 2012 (2121) or later, IGME-330 is required for your degree program unless you enrolled in 4002-360 in quarters.
This course provides students the opportunity to explore the design and development of Media Rich Internet Applications (MRIAs). This course moves beyond client and server side web development, and explores issues of presentation, interactivity, persistence, and extensibility common among such applications. Specifically, items explored include framework characteristics, data management, persistence, data binding, information manipulation, as well as data presentation. (IGME-202 Interactive Media Development [4080-330] and IGME-230 Website Design & Implementation [4080-309])

6  Game Design and Development Advanced Elective Courses

6.1  Policies

These courses are advanced elective options for all GDD majors. Like your core courses, some of these courses are new courses, and others are “semester versions” of previous offerings. Some of the new Advanced Electives are stable, semester versions of courses that were offered as seminars under quarters. So, we have noted situations where you should not take a course if you took a specific seminar under quarters.

IGM EXPECTS that in SEMESTERS at least 50% of your Advanced Electives come from IGM. The courses that are currently on the schedule for the upcoming semester are noted below, but we expect that the list of available courses from IGM will continue to grow.

If you would like to take a non-IGM course and have it count as an Advanced Elective, please note the following:

- At least 50% of your Advanced Electives must come from IGM.
- For a course outside of IGM to be considered an Advanced Elective, it should come from the College of Computing and Information Sciences (GCCIS) and/or the College of Imaging Arts and Sciences (CIAS).
- The course must be a 200-400 level course (CIAS) or a 300-400 level course (GCCIS) and have at least one pre-requisite requirement(s) to take the course.
- You will also need permission to take a non-IGM course and have it count as an Advanced Elective. IGM permission is required. You should contact your Academic Advisor if this is an option that you would like to pursue. If the course cannot be counted as an Advanced Elective, it may be possible to have it count as a General Education or Free Elective; again, this is something that your Academic Advisor can assist you with.

Please note that you may not “repeat” a semester version of a course and expect it to count towards your Advanced or Free Electives. Please be aware that some courses that were previously coded as IGME 590 courses are now listed as official courses with different names/course numbers and may not be able to be retaken. Aside from the IGM Production Studio and Research Studio courses, the only time/reason that you may re-take a course and expect it to “count” is to replace a grade and/or meet the semester course pre-requisites. Please read these descriptions carefully and ask your academic advisor if you have any questions.

Advanced Elective courses are listed in numeric order. Any prerequisites for a course are listed in parentheses.

6.2  Descriptions

***A note about IGME 317 3D Asset Pipeline for Videogames*** This course is for students in the College of Imaging Arts and Sciences (CIAS) degree programs, only.
**IGME-340 Multi-Platform Media Application Development** This course is the semester “equivalent” of IGME 590: Multi-Platform Media Application Development. If you have completed IGME 590: Multi-Platform Media Application Development, **DO NOT enroll in IGME-340.**

Interactive media applications are no longer restricted to personal computers. They can now be found on many distinct hardware platforms including mobile, tablet, wearable, and large-screened computing devices. In this course, students will learn to design, prototype and develop media rich interactive experiences that can be deployed to a wide variety of hardware devices. Programming projects are required. (IGME 106 Game Development and Algorithmic Problem Solving II or IGME 201 Interactive Design and Algorithmic Problem Solving III or equivalent)

**IGME 420 Level Design (3 Credits)** This course is the semester “equivalent” of IGME 590: Level Design. If you have completed IGME 590: Level Design, **DO NOT enroll in IGME 420.**

This course introduces level design theory and best practice through game level analysis, evaluation, and creation. Students will learn by analyzing game levels from existing games and discussing what made those levels successful or unsuccessful. Through their analysis and hands on experience, students will gain an understanding of overall level design including layout, flow, pacing, and balance. They will enhance their understanding of level design principles by creating their own game levels. (IGME-219 2D Animation and Asset Production [4080-347] and IGME-220 Game Design & Development I [4080-380]).

**IGME-421 Tabletop Game Development (3 credits):** This course is the semester “equivalent” of IGME 590: Modern Board Game Design. If you have completed IGME 590: Modern Board Game Design, **DO NOT enroll in IGME 420.**

This course explores issues pertaining to design, mechanics, development, and production of analog, tabletop “hobby” games, which include board games, card games, wargames, and other non-digital games catering to multiple players. Students will analyze and apply concepts and mechanics of modern tabletop game design, and build and test tabletop games. Students will work with development and prototyping tools, explore component design and art direction, and work with desktop publishing technologies. In addition, they will work directly with board game publishing and manufacturing technologies and services, and study factors pertaining to the business of tabletop games. (IGME 220 Game Design & Development I [4080-380] or equivalent course).

**IGME-430 Rich Media Web Application Development II (3 credits):** This is a new course.

This course provides students the opportunity to continue the exploration of Media Rich Internet Applications (MRIAs). Topics include communications for media ecologies, distributed web application frameworks, advanced interactivity, data transformation, representation, automation, persistence, and large scale systems deployment. In addition, students are exposed to concepts and technologies related to the next generation of MRIA development. (IGME-330 Rich Media Web Application Development I [4080-431 & 432])

*Additional course notes about IGME-430 Rich Media Web Application Development II

A primarily Javascript/Node.js server and client course for building rich media web apps (desktop and/or mobile). The class will focus a lot on web servers. We’ll be looking at login systems, the MVC (Model View controller) design pattern, the MVVM (Model-View-View-Model) design pattern, noSQL databases, memory caching, API design, client-side web frameworks, server configuration & deployment, event-based servers vs threaded servers, dynamic pages & templating, unit testing & more. Though the class is rich web app focused, but the concepts apply to many other software projects across mobile, desktop and consoles.

**IGME-450 Casual Game Development (3 credits):** This is a new course.
This course explores the design and construction of casual game experiences. Topics include modes of casual game play, mechanics for casual games, characteristics of successful games, development processes, and the distribution of casual games. Students will create casual games, and employ technologies to address issues of scalability, presentation, social interconnectivity, and game analytics. (IGME 202 Interactive Media Development [4080-330])

IGME-451 Systems Concepts for Games and Media (3 credits). This is a new course.

This course focuses on systems-based theoretical models of computation in the context of a media-delivery modality. Students will explore concepts such as memory management, parallel processing, platform limitations, storage, scheduling, system I/O, and optimization from a media-centric perspective. Particular emphasis will be placed on the integration of these concepts in relation to industry standard hardware including game consoles, mobile devices, custom input hardware, etc. (IGME 309 Data Structures & Algorithms II [4080-487])

IGME-470 Physical Computing and Alternative Interfaces (3 credits): This is a new course.

The rich variety and widespread adoption of gestural touch screens, motion-sensing devices, weight-reactive surfaces, wearable digital devices, and similar interface products demonstrates the demand for well-integrated devices and services that seamlessly couple people and environments. Such products can interface computers with real-world inputs and outputs, and give people new ways of controlling and experiencing their devices and information. This course provides a rapid technical introduction to basic electronics (components, circuits, microcontrollers, etc.) and emphasizes the application of interface design concepts to physically interactive and innovative product development. The course requires solo and team projects that blend electronics, programming, and design. (Third-year standing and IGME-102 New Media Interactive Design and Algorithmic Problem Solving II [4080-231] or IGME-106 Game Development and Algorithmic Problem Solving II [4080-222]).

IGME-540 Foundations of Game Graphics Programming (3 credits): This is the semester repackaging 4080-501 Foundations of 2D Graphics Programming and 4080-502 Foundations of 3D Graphics Programming. If you have completed both 4080-501 and 502, do not enroll in this course. If you have completed 4080-501 but not 502, enroll in this course.

Students will explore the use of an advanced graphics API to access hardware-accelerated graphics in a real-time graphics engine context. The course will involve discussion of scene graphs, optimizations, and integration with the API object structure, as well as input schemes, content pipelines, and 2D and 3D rendering techniques. Students will also explore the advanced use of the API calls in production code to construct environments capable of real-time performance. Students will construct from scratch a fully functional graphics engine, with library construction for game development. (IGME-309 Data Structures & Algorithms for Games & Simulations II [4080-487])

IGME-571 Interactive Game Audio (3 credits): This is the semester equivalent of 4080-535 Interactive Game Audio. If you have completed 4080-535, you should not enroll in IGME-571.

This course provides students with exposure to the design, creation and production of audio in interactive applications and computer games. Students will become familiar with the use of sound libraries, recording sounds in the studio and in the field, generating sound with synthesizers, and effects processing. Students will create sound designs for interactive media, integrating music, dialog, ambient sound, sound effects and interface sounds within interactive programs (IGME-202 Interactive Media Development [4080-330]).

IGME-582 Humanitarian Free & Open Source Software Development (3 credits): This is the semester equivalent of 4080-445 Humanitarian Free and Open Source Software Development. It may count
for an IGM Advanced Elective, a General Education Elective, or a Free Elective (this is not a change). If you have completed 4080-445, you should not enroll in this course.

This course provides students with exposure to the design, creation and production of Open Source Software projects. Students will be introduced to the historic intersections of technology and intellectual property rights and will become familiar with Open Source development processes, tools and practices. They will become contributing members of humanitarian software development communities such as the One Laptop Per Child and Sugar communities. Students will actively document their efforts on Humanitarian Free and Open Source Software community hubs. (Third-Year Standing)

IGME-585  Project in FOSS Development (3 credits). This is a new course.

Free and Open Source Software development is an internationally growing methodology for distributing work across multiple developers. The process can be applied to small “garage-sized” teams (small utility packages, multimedia plugins, simple games) or teams of hundreds (Mozilla, Java, Linux). This course builds on the introductory experience provided in the prerequisite to provide hands-on open-source development experience in a large-scale, project that will be prepared for open-source distribution. The actual projects and domains addressed will vary offering to offering, but will be along the lines of those listed above. (IGME 582 Humanitarian Free & Open Source Software Development [4080-445]).

IGME 589-01 Research Studio (3 credits). This is a new course.

Course description coming soon.

IGME 589-02 Research Studio (3 credits). This is a new course.

Course description coming soon.

IGME 589-03 Research Studio in Medical Anatomy App Development with Virtual Reality (3 credits). This is a new course.

This research studio will be a collaboration between IGM and a class in the RIT Medical Illustration department. Both classes will meet at the same time in the same lab, and work together on the same project. Students will develop a tool for medical professionals to study anatomy realtime using virtual reality. Users will be able to view animations and pose the model, to virtually dissect the model to see muscles, veins, bones, etc., and to rotate the model and interact with it realtime – all while in a virtual reality environment. Medical Illustration students will be focusing on the assets, including high poly sculpting, normal maps, rigging, and blendshapes. IGM students will be focusing on programming and design tasks using Unity 3D, such as visualization and simulation development, user interface design, asset integration and VR implementation. Both classes will be focused on optimization, agile software development, the asset pipeline, and game development best practices.

IGME 590-01 Data-Oriented Game Development (3 credits). This is a new course.

This course emphasizes sustainable software implementation in terms of both efficiency and power usage for game developers. The purpose of all programs, and all parts of those programs, is to transform data from one form into another. Some ways of designing software are more efficient in terms of both speed and power usage. As games challenge the limits of modern hardware and new designs force higher frame rates (e.g. VR and 90 fps), data-oriented design has become more important. A deep dive into the data-oriented design paradigm will be emphasized in terms of how hardware, compilers, algorithms, and the data layout of programs can be improved both in terms of speed as well as power usage. Software projects are required. (Students should have completed IGME-309 Data Structures & Algorithms for Games & Simulations II [4080-487]).
IGME-590-03 Undergraduate Seminar (3 credits). This is a new course.

Course description coming soon.

IGME-590-04 Undergraduate Seminar: German Game Industry (3 credits). This is a new course.

This course will immerse students in the German games industry via an immersive study-abroad experience. The course will hold several meetings on campus before departure, but the bulk of the course will center on a two-plus-week intensive experience in Germany. RIT students will attended lectures at the University of Paderborn with German students, participate in a game jam there over several days, and tour the Nixdorf Museum, the largest museum of computing in the world. Students will then spend the rest of the course visiting German game studios in Hamburg, Dusseldorf, and Cologne. International travel is required. Applications were due during fall semester and accepted students will be notified by Professor Stephen Jacobs. Accepted students will be added to this course by the IGM Department. (IGME-320 Game Design and Development I [4080-381] or IGME-330 Rich Media Web Application Development I [4080-432] or permission of instructor).

IGME-590-05 Modding Games (3 credits). This is a new course.

This course introduces video game design theory and implementation through modding. Modding is taking an existing game, developed by a AAA studio and examining how it is created by delving into the code and assets that make up the game. Then students will modify the codes and assets to create new content like levels, quests, entities, NPCs, in game objects and many other things. Through their analysis and hands on experience, students will gain an understanding of how a professional game companies build the experience for the player. They will enhance their understanding of design and development principles by creating content that functions seamlessly within that experience. (Third-year standing and IGME-219 3D Animation and Asset Production [4080-347] and IGME-220 Game Design & Development I [4080-381])

7 IGM Undergraduate Advanced Elective Project Classes

IGM offers a variety of project-based classes (e.g., Production Studio, Research Studio, and others) in addition to regular courses and seminars that often have term projects. The table below summarizes common project courses. Note that project courses provide an excellent opportunity for developing your portfolio and improving in your skills in a variety of areas. By planning ahead and obtaining instructor approval, students could connect/extend project work through many classes, which would potentially add significant polish.

<table>
<thead>
<tr>
<th>Class</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGME-499</td>
<td>Undergraduate Co-op</td>
<td>If you are on co-op, you must not double-count that work for course credit. RIT requires this distinction when working on a project: pay or credit but not both. For example, if you are working with a professor on a co-op, and that project that has some components happening in Production Studio, you must not enroll in that class.</td>
</tr>
<tr>
<td>IGME-540</td>
<td>Foundations of Graphics Programming</td>
<td>Although game graphics programming requires a team project, it focuses on modern computer graphics technology. If you have taken IGME-309 (“DSA2”), consider IGME-540. There are multiple development-oriented courses in the curriculum (physical computing, AI, engines, and more) that also nicely follow from DSA2.</td>
</tr>
<tr>
<td>IGME-580</td>
<td>Production Studio</td>
<td>Student teams pitch projects to the instructor. Upon approval, students step through the production process to complete their project. This course is flexible and provides an ideal opportunity to develop your expertise, skills, and professional project portfolio. See Research Studio (IGME-589) for professor-generated projects. See also the FAQ below.</td>
</tr>
<tr>
<td>IGME-581</td>
<td>Innovation &amp; Invention</td>
<td>“I&amp;I” fosters teamwork for new ideas, not pre-existing projects, across the campus. Although you can use Production Studio to explore new development, you may want to consider I&amp;I.</td>
</tr>
</tbody>
</table>
5.1 **Course Listings**

Enrollment guides, which are posted along with this document
[https://sis.rit.edu](https://sis.rit.edu) – click on “SIS Course Catalog Search”
[https://www.rit.edu/upub/pdfs/Undergrad_Course_Descriptions.pdf](https://www.rit.edu/upub/pdfs/Undergrad_Course_Descriptions.pdf)

5.2 **Production/Research Studio FAQ**

**Enrollment Requirement**
This course is restricted to students in NWMEDID-BS or GAMEDES-BS with at least 3rd year standing. If you have team members working on your project from outside IGM, please have them fill out the form at “I’m a non-IGM major…” from [https://www.rit.edu/gccis/igm/advising-faq](https://www.rit.edu/gccis/igm/advising-faq).

**How many times can I take Production/Research Studio?**
You can take it as many times as you want as an undergraduate student.

**How many studios will count toward Advanced Electives?**
Students can take any combination of 2 Production and/or Research Studios to count towards their advanced electives (ex: 2 Production Studios, 2 Research Studios, 1 Research Studio and 1 Production Studio). A student may choose to take additional Production and/or Research Studios, but these would count towards their Free Electives.

**What projects can I work on?**
In IGME-580 Production Studio, students pitch the projects.
In IGME-589 Research Studio, instructors pitch the projects.

5.3 **Independent Study FAQ**

This course seems a lot like Production/Research Studio.
You are correct! In most cases, students should take one of the “studios.” However, when you have a topic you’d like to research or a skill you’d like to develop, an independent study (IS) is a good option. For example, a NMID student might want to study wearable computing, or a GDD student might want to explore networking in more detail. The main restriction is that there is no comparable IGM class.
How do I find/generate an Independent Study?
Unless a faculty member specifically advertises an IS, the work is up to you to find a faculty member, pitch the idea, and develop the proposal. Planning ahead by taking classes, visiting office hours, reading Insights, and talking with your faculty and academic advisors will help.

Is there a form?
You can obtain the form from a faculty member or your advisor.

Who fills out the form?
Both you and the faculty sponsor. Once your sponsor has obtained the form, please collaborate to fill in the required information. The form has additional instructions. Once complete, the faculty sponsor or the student will bring the completed application to the IGM office for approval from our Undergraduate Coordinator.

Can I do an Independent Study from outside of IGM?
Yes, but you must check with your academic advisor in advance to determine if the course will count as an advanced elective (assuming you want it to).

8 Who to Contact

Please refer to https://www.rit.edu/gccis/igm/undergraduate-advising. If you have any questions regarding what you read in this enrollment guide, your IAP, or for any other reason, please contact your Academic Advisor ASAP.

Amanda Thau          Undergraduate A-K          absrla@rit.edu
Kathleen Schreier Rudgers   Undergraduate L-Z          kmsrla@rit.edu

Walk-In Advising Hours: Monday, Tuesday and Wednesday, 2:00-4:00 PM; Thursday and Friday, 10:00 AM-12:00 PM

To schedule an appointment with your advisor:

https://sis.rit.edu/info/welcome.do
https://mycourses.rit.edu/index.asp

Steps to Scheduling an Appointment:

1. Log in to SIS or myCourses
2. Click “My Success Network”
3. Click on the link under your primary advisor’s name
4. Click “Schedule Appointment”