



BACHELOR of SCIENCE GAME DESIGN & DEVELOPMENT PROGRAM HANDBOOK

AY 2018-2019 | School of Interactive Games and Media

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Abstract

This handbook describes RIT's undergraduate Game Design & Development program (**GAMEDES-BS**, or more informally, **GDD**) and serves as a guide for currently enrolled students. Please direct questions or comments on this handbook to your advisor in the School of Interactive Games and Media (IGM), <https://www.rit.edu/gccis/igm/academic-advising-overview>. **Note that all of these policies are subject to change—any changes will be announced and posted via communication to students.**

1 IGM

The School of Interactive Games and Media is located in GOL 2145. Please refer to <https://www.rit.edu/gccis/igm/> and <https://www.rit.edu/gccis/igm/contact> for more information. You can find specific staff and faculty contact information at <https://www.rit.edu/gccis/igm/key-players#faculty>.

2 The Game Design & Development Degree

Please refer to <https://www.rit.edu/gccis/igm/bs-game-design-development-overview> to learn about Game Design & Development and related programs at RIT. See also Section [6.8](#).

3 Advising

The School of IGM has many advising resources, including academic advisors, faculty advisors, IGM's Undergraduate Coordinator, Director, and Associate Director, and support staff. Please refer to <https://www.rit.edu/gccis/igm/key-players#staff>

Please work with your *academic advisor* to create a course plan, e.g., determining which course counts for the variety of requirements and electives. Please refer to the advising website on how to make an appointment and the “walk-in hours” (i.e., short questions with no appointments) schedule.

Faculty advisors are great at helping you with career plans, planning the kinds of courses to take, and general advice about academics and industry. Sometimes a faculty member has independent studies or funding for co-ops. To find your faculty advisor, log onto <https://sis.rit.edu> and refer to <https://www.rit.edu/gccis/igm/key-players#faculty> for contact information. Generally, faculty post their office hours on or near their doors and/or their websites, which you can access via <https://www.rit.edu/gccis/igm/key-players#faculty>. Please also refer to your course syllabi.

If you need help, please start with your academic advisor, your faculty advisor, and our posted advising resources at <https://www.rit.edu/gccis/igm/academic-advising-overview>. IGM's Undergraduate Coordinator, as well as our Director and Associate Director are also available if you need further help.

4 Communication

Along the way, we will keep you updated via an e-mail newsletter called *IGM Insights*, which we require you to read. We post current events on the IGM website, but also use social media including Facebook (<http://www.facebook.com/igmrit>), Twitter (@IGMRIT) and Instagram (@igmatrix).

5 Registrar

If you need transcripts, RIT forms, catalogs, and more, see <http://www.rit.edu/academicaffairs/registrar/> and select options on the “Current Students” menu.

6 Academic Plan

Please visit <https://www.rit.edu/gccis/igm/> and you will see a link called BS – Game Design & Development. This page has further submenus that contain helpful details about the program. You can view the current program flow chart and course descriptions at <https://www.rit.edu/gccis/igm/curriculum>.

6.1 What is Required to Graduate?

To graduate with a BS in Game Design & Development, you must complete 124 semester credit hours and 2 co-op opportunities. You can take courses year-round, though there are fewer choices for classes outside of the Fall and Spring terms. The 124 credits that you need to graduate are broken down as follows:

- 41 credits of GDD Core Courses
- 12 credits of IGM Advanced Electives
- 3 credits of First Year Writing
- 15 credits of Arts & Sciences Perspectives
- 9 credits of Immersion Experience
- 15 credits of General Education Electives
- 14-15 credits of Math and Science
- 15 credits of Free Electives
- 1 Co-op Preparation Workshop, non-credit bearing
- 2 different Wellness or Activity courses are also required, but they are non-credit bearing
- YearOne, non-credit bearing
- 2 Co-operative Education experiences, non-credit bearing
- 3 Writing Intensive courses (First Year Writing (FYW), a program course (IGME-236), and a third course of your choosing)

6.2 General Education Requirements

As you see in the list of courses, you have several liberal arts, science, and math courses, which colleges tend to call *general education*. If you see the label *LAS* or *general education* in your course list or online material, it means *Liberal Arts and Science*. General Education is intended to broaden your educational experience, and is typically filled with courses from the College of Liberal Arts (COLA) or the College of Science (COS - which provides Math and Science courses). For the complete set of rules, see <http://www.rit.edu/programs/undergraduate-graduation-requirements>. Below, we summarize the key aspects. You can view the current program flowchart at <https://www.rit.edu/gccis/igm/curriculum>.

6.2.1 First Year Foundation Courses

Besides *YearOne* (Section [6.4](#)), first-year students have First Year Writing (FYW). Incoming students must successfully complete or have previous credit for ENGL-150, UWRT-150, or ISTE-110.

This course is part of the LAS Foundation. Please refer to <http://www.rit.edu/programs/undergraduate-graduation-requirements#newgened> for more details.

6.2.2 Writing Intensive Courses

Every technical practitioner needs to write, especially when it comes to specifications, communication with clients, and internal documents. In addition to first year writing (Section [6.2.1](#)), students must take *two more* writing intensive courses—one within the major and another within their General Education requirements (<https://www.rit.edu/academicaffairs/policiesmanual/d015>).

Your majors' writing intensive class (PR-WI) is IGME 236. Students have the choice to select a General Education writing intensive course (GE-WI) or another program writing intensive course (PR-WI) for their third writing course. The third course can also fulfill another graduation requirement such as LAS Perspective, General Education Elective or Free Elective. Please see your advisor for further information. To find all Writing Intensive courses, search SIS for courses labeled with a *writing intensive* (WRTG) attribute.

6.2.3 Liberal Arts

Liberal arts tend to involve studies outside of math and science, like psychology, sociology, history, and many other subjects, which greatly help technical fields. Knowing how people think and react is essential to anyone designing interactive software.

Along with the general education requirements in Section [6.2](#), see <http://www.rit.edu/cla>. Both sites explain the liberal arts requirements. The College of Liberal Arts maintains their own advising center in the Office of Student Services on the second floor of the Liberal Arts building. If you have any questions about Liberal Arts transfer credits, Liberal Arts Immersions and Minors, or anything else in this block of courses, you need to work directly with the Liberal Arts advisors.

6.2.4 Perspectives

Besides the two Foundation courses (Section [6.2.1](#)), you have eight additional LAS *Perspective* courses, as described at <http://www.rit.edu/programs/undergraduate-graduation-requirements#newgened>. PHYS-111 fulfills the Natural Science perspective. Students with prior calculus experience may wish to consider PHYS-211: University Physics instead of PHYS-111. The two Mathematical Perspectives are fulfilled by MATH-131: Discrete Math and MATH-185: Mathematics for Graphical Simulations I. See Section [6.2.6](#) below.

6.2.5 Immersions

The general education site briefly refers to an *Immersion* as a “a series of three related general education courses that further broaden a student’s judgment and understanding within a specific area through deeper learning.” An Immersion is akin to a concentration in which you “drill down” on a particular subject area. For example, a GDD major might wish to consider psychology to reinforce understanding of human interaction with technology. Refer to <http://www.rit.edu/programs/immersions>. To help you find an

immersion that fits your interests and goals, you can use the Navigator tool located here <https://www.rit.edu/cla/academics/navigator/>.

6.2.6 Mathematics

See <http://www.rit.edu/programs/undergraduate-graduation-requirements#mathsci> to learn more about the Mathematical Perspectives. You need to take Discrete Mathematics (MATH-131), along with Mathematics of Graphical Simulations I (MATH 185). Students must complete a third Math course and can elect to take Project Based Calculus I (MATH-181), Calculus I (MATH-181A), or Calculus A (MATH-171). The selection of this course will depend on your Math Placement Exam score (<https://www.rit.edu/science/sms/mpe>). You may elect to take additional math and science courses, via your immersion, general education electives or free electives.

6.3 Elective Courses

Your schedule allows for three categories of elective courses: General Education Electives, Free Electives, and IGM Advanced Electives.

Free electives: You can fill free elective credits with any credit-bearing course at RIT. Free electives are an especially good opportunity to take classes outside of IGM. Sometimes students use free electives to pursue a minor or in anticipation of graduate school in another field.

General Education electives: GAMEDES-BS students have five open general education electives that you can fill with any course considered part of RIT's general education classification. Although more restrictive than free electives, these courses will round out your technical education. Students sometimes use these electives to pursue a minor within a General Education discipline. General Education electives typically come from Math, Science, and/or Liberal Arts disciplines. You can search for any General Education elective course using Tiger Center: <https://tigercenter.rit.edu/>

IGM Advanced Electives: All college majors offer their students an opportunity to explore, and often, concentrate on specific aspects of their fields. For example, you may wish to “drill down” and specialize in a particular topic, like engine development, graphics, or game design. Refer to Section [19](#), SIS, and the IGM website for a complete list of advanced electives, as these courses continue to grow and change.

The current IGM policy requires you to take 50% of your advanced electives from IGM. These courses have the IGME course code. *With advisor approval*, you may fill other advanced electives with GCCIS (300 level or above) or CIAS (200 level or above) courses. For more information, refer to Section [19.2](#).

6.4 YearOne

All incoming first-year students must take *YearOne*, designed to prepare them for success at RIT. See <http://www.rit.edu/~w-asc/YearOne-faqs.php> for more details.

6.5 Wellness

Students are required to complete two different wellness activities. Please refer to <http://www.rit.edu/programs/undergraduate-graduation-requirements#wellness> for more information.

6.6 Co-op Courses

GDD students must successfully complete two co-ops, which count toward your graduation requirements. Please refer to Section [14](#) for more details.

6.7 Minors and Double Majors

Please refer to your academic advisor concerning minors and double majors. There are several procedures to follow. If you are a prospective student, please contact IGM Advising (<https://www.rit.edu/gccis/igm/academic-advising-overview>) before seeking an IGM minor (<https://www.rit.edu/gccis/igm/igm-minors-overview>) or double major within an IGM program (<https://www.rit.edu/gccis/igm/cop-and-double-majors>). Please note that students in the GAMEDES-BS degree cannot minor in Game Design or Game Design and Development.

6.8 When to Take What

Please refer to your Academic Advising Report (AAR) in SIS. We also post the current year's flowchart at <https://www.rit.edu/gccis/igm/curriculum>. See also <https://www.rit.edu/gccis/igm/bs-game-design-development-overview>.

For the first two years, all students in the GDD program take more or less the same courses. During this time, the focus is on building your foundational GDD skills and preparing you for your first co-op.

- First year: A typical semester in the first year will consist of IGM courses, first year requirements, liberal arts courses, and math/physics courses.
- Second year: Building on foundational math, programming, physics, writing, and media, students reach key courses on game design and game development and complete the Co-op Preparation Workshop. In general, the best plan is to mix a few of each type of course every semester, rather than take “all Liberal Arts” one time and “all Game Design” another. If you have questions or concerns about which courses you should take when, see one of the IGM academic advisors.
- Co-op: typically, students go on co-op the summer following the second year, usually for a single co-op block. The 2nd co-op may be completed at any time during the 3rd and 4th years, including the summer after the 3rd year. *Students are strongly discouraged from waiting until all of their courses are complete before seeking a co-op.*
- Wellness: The wellness requirements may be completed during any semester(s).

Third and fourth years: Students finish the IGM core and specialize via their electives. In addition, you will choose a Liberal Arts Immersion and take free and general education electives. To accommodate co-op, your schedule for years three and four has some flexibility, but you should plan to take IGM courses in each fall and spring semester. Plan carefully and check with your advisors (academic and faculty) to make sure you are on campus during the semesters that the courses you want are offered.

7 Course Enrollment

Enrollment at RIT is done both by year level at RIT and by appointment. Therefore, upperclassmen get “first crack” at courses before first and second year students. It pays to enroll as early as you can. If you wait, you will find many courses closed.

To enroll in courses, visit the *Student Information System* (SIS, <https://sis.rit.edu>) or Tiger Center: (<https://tigercenter.rit.edu/>). You will be assigned a particular date and time that enrollment becomes open to you. This date and time will change every semester. When enrolling in a course, check the course description and the prerequisites (See also Section **19** below). SIS will block you from enrolling in a course for which you do not have the prerequisite(s).

Every program on campus requires Arts & Sciences Perspectives. As you might suspect some of these courses are more popular than others, and, therefore, enrollment is limited in some courses (generally assigned on a first-come, first-served basis). Therefore, you will find that you get a better selection of courses if you enroll as early as possible.

Access to GDD courses is restricted to IGM majors before we allow others to enroll. So again, enroll as early as you can to maximize your chances of getting what you want. If you have trouble putting together a schedule, see your academic advisor for alternatives.

Questions regarding enrollment in non-IGM courses (Liberal Arts, Computer Science, Math, Design, etc.) should be directed to the program that “owns” the class.

Academic Advisors enroll students in only their first semester of courses. In every future semester, students will self-enroll.

8 Academic Accommodations

RIT provides support for students with disabilities. For more information, please refer to <https://www.rit.edu/studentaffairs/disabilityservices/>.

9 Grading

Please refer to <https://www.rit.edu/academicaffairs/policiesmanual/d050> for RIT’s policies on grades. If you have trouble finishing (or with failing) a course, please see Section **11** below. If you wish to dispute a final grade, please consult <https://www.rit.edu/academicaffairs/policiesmanual/d170>.

10 Final Exams

Ensure that you check SIS (<https://sis.rit.edu>) for your final exam schedule and with your instructor to ensure you actually have a final exam in the course. If you have an exam conflict between an IGM course and another course, the IGM course instructor is supposed to offer a make-up. If you have three final exams in one day, you can request a make-up for one. For specific rules (and even more cases), please refer to <https://www.rit.edu/academicaffairs/policiesmanual/d110>.

11 Leaving a Course

Occasionally you get into a class and you realize that you either:

- lack the right background for the course, or
- overloaded yourself with too much work for one semester.

If these problems happen, you should either drop (during add/drop week *only*) or withdraw from the course as soon as possible. Use the deadlines/dates listed at <http://www.rit.edu/calendar>. See the next sections below to learn about dropping vs. withdrawing.

11.1 Dropping

If you drop a course within the add/drop period of any semester, the course will not appear on your transcript. The add/drop period is the first seven calendar days, excluding Sundays and holidays, of the Fall and Spring terms (please check the RIT Academic Calendar for specific dates). You can use the Student Information System (<https://sis.rit.edu>) or Tiger Center (<https://tigercenter.rit.edu/>) to add or drop a class during this time. After the drop period has passed, you must withdraw (drop with penalty) from the course, which we explain in the next section.

11.2 Withdrawing

If you withdraw from a course between the second week and the end of the eleventh week (see the Academic Calendar for specific dates), then a “W” appears on your transcript, indicating that you withdrew from the course. You can use SIS to withdraw from a course electronically, but you should first meet with your instructor and academic advisor to discuss your options and the consequences that may come with withdrawing from a course. In terms of finances and course withdrawals, please refer to <https://www.rit.edu/academicaffairs/policiesmanual/d060>. Please also contact the Office of Financial Aid and Scholarships.

11.3 Failing

If you do not officially drop or withdraw, but simply stop submitting work and/or attending class, you will likely earn a grade of “F” for the course. This grade becomes part of your official transcript at RIT, lowers your GPA, may restrict financial aid, and may have other potential consequences. If you believe you are overloaded, see your advisor and map out a plan immediately! If that plan includes withdrawing from a course, then do so as soon as possible so that you can focus on salvaging your remaining courses. If you do not take action, poor performance in your classes could result in academic probation or suspension. Refer to Section [13](#) for more information.

11.4 Incompletes

In rare cases, you might have extenuating circumstances, e.g., medical problems that do not allow you to finish a course. As explained in Section II.B of <https://www.rit.edu/academicaffairs/policiesmanual/d050>, if you have a situation outside of your control, you may be eligible for a grade of *Incomplete* (“I”). Examples include *serious* matters of life and health—getting behind or overwhelmed do not warrant incompletes, and IGM gives instructors strict guidelines to follow when granting incompletes. Do not request “make-up” work simply to avoid failing or improving your grade.

Even in serious matters, you should still have “passing equity” in at least half the course material, which means that your instructor may not grant an incomplete. We strongly recommend withdrawal before requesting an incomplete. Regardless of the severity of the matter, if you have issues completing a course, we strongly recommend you consult with your instructor and advisors immediately.

12 Change of Program

If you are considering changing your major, you must meet with the prospective new department to learn more about their admission policies, graduation requirements, and timeline for changing programs—each department at RIT has different policies. Other resources include Career Counseling (<https://www.rit.edu/emcs/oce/student/career-counseling>) and Change of Major Advising through University Exploration (<https://www.rit.edu/academicaffairs/universityexploration/>). If you are an undergraduate student seeking an IGM degree, please see <https://www.rit.edu/gccis/igm/cop-and-double-majors>. Please contact IGM Advising (<https://www.rit.edu/gccis/igm/academic-advising-overview>) if you have any questions.

Once you have decided to change your major, meet with your *current* academic advisor to complete the Change of Program/Plan paperwork (see <http://www.rit.edu/academicaffairs/registrar/forms>). The advisor will send the paperwork to the *prospective* new department. Please remember that departments decide to whom they will accept or deny admission.

To those applying to IGM degrees, please remember that we have programs with capped enrollment, which means we must carefully decide who to accept.

13 Academic Probation, Suspension, Leave of Absence

13.1 Academic Probation and Suspension

It is important that you be aware of the procedure when you have academic trouble. To maintain good standing in Game Design & Development and at RIT you must maintain a “C” average, which translates into a minimum grade point average (GPA) of 2.0. RIT’s rules for probation and suspension (<https://www.rit.edu/academicaffairs/policiesmanual/d051>), are pretty complex, and so, we summarize the policies below.

You have two GPAs:

- A cumulative GPA (computed from every course you’ve ever taken at RIT), and
- A semester GPA (just the courses you took in a particular semester).

If either of these GPAs falls below 2.0 for a given semester, then you will receive a first academic probation. If any of these GPAs is below 2.0 for a second semester (at any time), then you will receive a second probation. Finally, if you have a third semester below 2.0 (at any time), then you will be suspended. Suspension means that you are ineligible to take courses at RIT for one year (a minimum of three semesters).

There is also an “express route” to academic suspension. If your semester GPA falls below 1.0 for any single semester, you will be suspended immediately, regardless of your other GPAs.

Most importantly: do not wait until you are in deep trouble before you ask for help! If you find yourself having academic difficulty, you should consult with your academic advisor or your faculty advisor. They will be able to assist you and help you formulate a plan that can keep you in good standing. If you are having extreme difficulty in a particular area, seek tutoring help on campus in the IGM labs

(<https://www.rit.edu/gccis/igm/tutors>) or utilize resources through RIT's Academic Support Center (<https://www.rit.edu/studentaffairs/asc/>). Remember—ask for help before problems arise.

13.2 Leave of Absence (LOA)

There are situations in which you might (or must) take a leave of absence, as specified in <https://www.rit.edu/academicaffairs/policiesmanual/d021>. If you are considering taking a voluntary Leave of Absence (whether immediate or in a future term), please contact your academic advisor. The department must approve all voluntary Leave of Absence requests.

There are also financial implications depending on when you decide to take a Leave of Absence:

- <http://www.rit.edu/fa/sfs/refund>
- http://www.rit.edu/emcs/financialaid/leave_of_absence.html

14 Co-Op

The Bachelor of Science degree in Game Design & Development requires two co-op experiences. *Co-op* is short for co-operative education in which you will work in your field before graduating to gain real-life professional experience. You will be compensated for the job, but more important, you gain on-the-job experience that is valuable when you graduate and begin to search for a full-time position. To help facilitate your finding a job, the Office of Career Services and Cooperative Education at RIT (<http://www.rit.edu/emcs/oce>) maintains job listings from companies seeking co-op students to work for them.

We have some rules to follow:

- To be eligible for co-op, you must have completed at least 64 credits with at least 32 credits of GDD courses, including IGME-209 (“DSA1”) and IGME-220 (“Game Design 1”).
- You must complete the IGM Co-op Preparation Workshop (IGME -99) during your sophomore year. This class covers everything you need to know about conducting your co-op search.
- You must complete all of your co-op requirements before you finish your last class, which means that you may not “end on a co-op.”

One final consideration: since most students are on co-op in the summer, the summer course offerings are sparse, particularly at in GDD advanced electives.

You should go out for your first co-op experience as soon as possible following your second year of classes, ideally the summer after your second year. A good first step toward getting your first co-op job would be to nail down your resume and get your portfolio in shape by the beginning of January and be ready to respond quickly to opportunities in early spring. Interviews for summer and fall co-ops will occur in spring. Once you accept an offer, you will need to report the co-op in Handshake. You cannot enroll in co-op on SIS—you must register it via Handshake. This process prompts the School of IGM office to enroll you on SIS. <https://www.rit.edu/emcs/oce/student-home>

To find co-ops, start with Handshake, via the “Student” link at <http://www.rit.edu/emcs/oce>. Sometimes we post leads via email and on social networks. See also the IGM weekly newsletter, *IGM Insights*.

You must complete two semesters of full time work to fulfill your co-op requirements. Full time is considered a minimum 35- hour work week over the course of an academic semester. In some cases, part-time work over an extended period or a series of short-term “consulting” jobs may be an acceptable substitute. Please see your advisor for more information.

Unless you have made prior arrangements with your place of employment, you must work the *entire* term in which you are employed. For example, if you start a fall co-op in late August, you must work until the term ends in mid-December. Please see your advisor for more information.

To obtain approval for a co-op you found outside of Handshake, please refer to <https://www.rit.edu/gccis/igm/how-enroll>.

An increasing number of GDD students are getting experience that is equivalent to co-op before they are eligible to register for a co-op. Some students have done summer internships or taken summer jobs while still in high school that provide experience relevant to GDD. Once you are eligible for co-op, you may petition to have one or more blocks of co-op waived. The process involves completing a self-evaluation and having your manager send a corroborating letter on company letterhead to the School (contact your IGM academic advisor).

Taking classes while on Co-op: In order for a student to take a class while on co-op, the student must first have a conversation with Financial Aid. Many times students do not realize the financial ramifications of being on co-op and taking a class at the same time. If after talking to Financial Aid a student still wants to request to take a class while on co-op, the student must meet with their Academic Advisor for approval. The Academic Advisor will discuss where this course fits into your degree completion. If the request is approved the student will only be permitted to enroll in a maximum of one course while on co-op.

For more information about co-op, contact your Career Services and Co-op liaison. Your liaison can be a great help in your search for a co-op job:

Last names A-K: Stephanie Ryan (sbroce@rit.edu)

Last names L-Z: Amanda Thau (abtoce@rit.edu)

15 Applying for Graduation

Once you have earned over 90 credits you will be eligible to apply for graduation online. You will receive an email from the Registrar’s Office with instructions on how to apply. It is your responsibility to apply for graduation and ensure the name and mailing address are accurate. We recommend that you apply as soon as you are eligible and no later than one semester before your last semester of classes. Within two weeks of your application submission, your academic advisor will perform a full degree audit which will outline all of the requirements you need to complete to graduate. This audit is incredibly important, as it will let you know if you will be able to graduate in the timeframe you expect.

After final grades are submitted for the semester in which you expect to complete your degree requirements, we will look at the credits you have earned since the time you applied for graduation and check them against what you had left at that time. If you have filled in all the blanks, we will certify you for graduation! If not we will send you a “lack letter” referring you to your Academic Advising Report (AAR) in SIS to determine remaining requirements. You will not be eligible to receive your degree until the next certification term

(likely the end of the following semester). If three or more semesters pass from the time you said you were going to finish in your degree application, you might have to apply for graduation again.

If three terms pass without any enrollment activity from you (you do not enroll in any courses at RIT, including co-op, for a whole year), you risk being declared “inactive,” which may result in your having to reapply to the GAMEDES-BS program through the Admissions office. In that case, you might end up losing some credits because you will be reapplying to the newest curriculum and not the curriculum you came in under originally. Bottom line: do not put off finishing that last course or two or obtaining your co-ops. Keep the School of IGM informed regarding your plans for graduation.

16 When the Curriculum Changes

GDD is an emerging academic discipline that we are helping to define with our curriculum. To help stay “ahead of the wave,” we tend to make changes to the curriculum on an annual basis. Most of these changes involve the addition of new courses to address new trends in the field. When you matriculate in the program, we will give you a Game Design & Development flowchart that lists all of the courses and requirements needed for graduation. The current academic year’s flowchart is online (<https://www.rit.edu/gccis/igm/curriculum>). If we make changes to the curriculum after you matriculate, you may choose to incorporate any or all of those changes in your worksheet. This policy is intended to give you the flexibility to stay with your original curriculum or take advantage of any curricular changes that work to your advantage. If you have any questions about whether it makes sense for you to opt for a particular curriculum change, see your IGM academic advisor or your faculty advisor.

17 Student Expectations

The expectations we have for our students fall into two general categories, effort and ethics. It is critical to your academic survival that you understand and meet these expectations.

To graduate from the GDD program, you will work hard, both inside and outside of class. The rule of thumb at RIT is that for each credit hour of a course, you can expect to work an average of three to four additional hours on that course outside of class per week. For a three-credit course, then, you can expect to work 10 to 12 hours outside of class per week just on that course. If you multiply that by five classes, which is the standard load, you get numbers like 50 to 60 hours per week. Does this sound like a full-time job? That is because it is a full-time job and why it is called being a full-time student.

Some of your courses will take less time than the average, but some will take more. Three to four hours per credit hour per week is the average. This is very different from high school, where the numbers are in the opposite direction. In high school, you typically spend less time on homework than you spend in class. In college, learning is primarily the student’s responsibility; lectures and labs are resources, but they are only the tip of the iceberg. To get the most out of your lectures and labs, you need to prepare for them. That means you need to do the assigned readings, homework, research, or practice exercises before the lectures or labs that assume you have done that work. Going into a lecture or lab unprepared is not a productive use of that resource. Going into an exam or a lab practical unprepared is a good way to fail a course.

Game Design and Development professionals are frequently entrusted with an enterprise’s most important asset—its information. GDD professionals must have strong ethical values, and they must behave ethically at all times. In these times of rapid societal change, brought about largely by the technology we deploy, we simply must do the right thing. This depends on two things, knowing what the right thing to do is, and

having the guts to do it. You will find that ethics is a topic in most of our courses, so you certainly will have many opportunities to learn what ethical behavior is. Having the guts to behave ethically ultimately falls on your shoulders.

Academic Integrity is one ethical issue that is vitally important (Section [20](#)). If you have any questions about the line between helping a classmate and cheating, or about any other ethical issues, talk with your instructor, your advisor, or a member of the faculty with whom you feel comfortable. In addition, if you are feeling overwhelmed with your classes and do not think you will be able to make a project deadline, talk with your instructor or advisor about what is going on, and do not succumb to the temptation to cheat. In short, do not place your academic career in jeopardy!

18 Intellectual Property

In general, students will usually own what they create, though they need to be careful concerning educational software licenses. Please refer to Section 5.D <https://www.rit.edu/academicaffairs/policiesmanual/c030> We recommend that students coordinate with MAGIC (<http://magic.rit.edu>), the Intellectual Property Management Office (<http://www.rit.edu/research/ipmo>), and/or the Simone Center (<http://www.rit.edu/research/simonecenter>).

19 Course Descriptions

Below you will find course descriptions for all IGM courses that count toward the B.S. in Game Design & Development, as well as course descriptions for the required math and physics courses. If a course does not appear here, it may not count towards major requirements for the Game Design & Development degree.

Please be aware that courses are in a constant state of change at RIT, due to the nature of our academic field. Just as the industry does not stand still, neither does the curriculum! As such, courses are constantly being revised and extended, and the descriptions and content changes over time. We strongly encourage students to review the official descriptions on the Student Information System: <https://sis.rit.edu>.

19.1 GAMEDES-BS Core Courses

All GDD majors must take all of these courses. Any prerequisites are listed in parentheses.

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 resumes and digital portfolios, and to prepare for interview situations.

IGME-105 Game Development and Algorithmic Problem Solving I (4 credits)

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 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. (Grade of “C-” or better in IGME-105 Game Development and Algorithmic Problem Solving I)

IGME-110 Introduction to Interactive Media (3 credits)

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.

IGME-119 2D Animation & Asset Production (3 credits)

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. The course will introduce students to both 2D and 3D characteristics of animation systems. (IGME-110 Introduction to Interactive Media)

IGME-202 Interactive Media Development (3 credits)

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 Interactive Design and Algorithmic Problem Solving III or IGME-106 Game Development and Algorithmic Problem Solving II) & MATH-185 Math of Graphical Simulation I)

IGME-206 Game Development for Programmers (4 credits)

An intensive review of the core features for problem solving within the domain of game design and development for students with a prior software development background. Topics include using existing frameworks, game software architecture, data structures, algorithms, threads, object-oriented design, and data-oriented development appropriate for games, simulations, or entertainment applications. Programming assignments are a required part of this course.

IGME-209 Data Structures & Algorithms for Games & Simulations I (3 credits)

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, PHYS-111 College Physics I, and MATH-185 Mathematics of Graphical Simulation I)

IGME-219 3D Animation and Asset Production (3 credits)

This course provides an overview of 3D game asset production. Basic ideas learned within the first asset production course are also revisited within the 2D 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 and Asset Production)

IGME-220 Game Design & Development I (3 credits)

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. (Year 2-5 in NWMEDID-BS or GAMEDES-BS)

IGME-230 Website Design & Implementation (3 credits)

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 or IGME-106 Game Development and Algorithmic Problem Solving II) & IGME-110 Introduction to Interactive Media)).

IGME-236 Interaction, Immersion, & the Media Interface (3 credits)

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 or IGME-106 Game Development and Algorithmic Problem Solving II) & IGME-110 Introduction to Interactive Media)).

IGME-309 Data Structures & Algorithms for Games & Simulations II (3 credits)

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 and (MATH-171: Calculus A or MATH -181 Project Based Calculus I or MATH-181A Project Based Calculus IA)

IGME-320 Game Design & Development II (3 credits)

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-220 Game Design & Development I)

IGME-330 Rich Media Web Application Development I (3 credits)

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-230 Website Design & Implementation)

19.2 Game Design & Development Advanced Electives offered through IGM

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

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.

Game Design and Development students who entered RIT in the fall 2161 (2016) semester and later must complete their Advanced Elective requirements by taking IGM courses, only. In other words, you may only take IGM classes to fulfill your Advanced Elective course requirements.

Game Design and Development students who entered RIT in the fall 2151 (2015) semester and earlier may continue to follow the 50% rule, where up to half of your IGM Advanced Elective requirements may be fulfilled by approved non-IGM classes. The list of pre-approved courses is available in your Academic Advising Report (AAR) in SIS.

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 from IGM to take a non-IGM course and have it count as an Advanced Elective. 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. Please consult your Academic Advisor.
- A full list of pre-approved advanced electives is located on your Academic Advising Report in SIS.
- Enrollment in non-IGM courses is determined by the department that “owns” the course. You may need to contact the department to enroll in a desired course.

IGME-340 Multi-platform Media App Development (3 credits)

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 New Media Interactive Design and Algorithmic Problems Solving III)

IGME-420 Level Design (3 credits)

This course introduces level design theory and best practices 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 3D Animation and Asset Production and IGME-220 Game Design & Development I).

IGME-421 Tabletop Game Design & Development (3 credits)

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).

IGME-430 Rich Media Web Application Development II (3 credits)

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)

IGME-431 Digital Video for the Web (3 credits)

Web-deployed video is an increasingly important medium. It is used for illustration, instruction, entertainment and marketing. Students working with video for the web require an understanding of its inherent qualities, limitations and how it may be implemented. This course will focus on video and specifically how to create and implement quality work suitable for web delivery. (IGME-202 Interactive Media Development & IGME-230 Website Design & Implementation)

IGME-440 Online Virtual Worlds & Simulations (3 Credits)

Students will create online virtual worlds and simulations using 3D development technologies. Critical to the exploration of this area, students will learn to utilize 3D constructs for the presentation of and interaction with interactive content and dynamic experiences. The course allows students to integrate prior knowledge in design, programming, and interaction for the creation of such experiences. Individual and group projects will be required. (IGME-202 Interactive Media Development & MATH-171 Calculus A or MATH-181A Calculus I or Math-181 Project Based Calculus I).

IGME-450 Casual Game Development (3 credits)

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)

IGME-451 Systems Concepts for Games and Media (3 credits)

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 for Games & Simulations II)

IGME-460 Data Visualization (3 credits)

Our world is flooded with data, and making sense of it can be a challenge. Visualizations help by exposing information, trends, and correlations that might otherwise go unnoticed in the raw data. In this course, students will learn to collect, clean, organize, and filter data sets of their own choosing. They will learn and apply principles from multiple fields including visual design, the psychology of perception, user experience design, and ethics. They will create static and interactive visualizations with a variety of information

structures (hierarchies, maps, timelines, etc.). Students will learn to develop exploratory experiences that tell the “story” within the data. Programming projects are required. (IGME-330 Rich Media Web App Development I)

IGME-470 Physical Computing & Alternative Interfaces (3 credits)

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. (IGME-106 Game Development and Algorithmic Problem Solving II or IGME-201 New Media Interactive Design and Algorithmic Problems Solving III)

IGME-529 Foundations of Interactive Narrative (3 credits)

This course focuses on the major elements of narrative for interactive environments. Students in this course explore the basics of narrative in the context of interactive games and media, with examination of digital storytelling in games and interactive environments of several varieties. Branching narrative, hypertext, multi- and non-linear concepts are also explored with an emphasis on balancing immersive and interactive aspects of digital narrative. (IGME-202 Interactive Media Development)

IGME-540 Foundations of Game Graphics Programming (3 credits)

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)

IGME-550 Foundations of Game Engine Design and Development (3 credits)

This course will provide students with theory and practical skills in game engine design topic areas such as understanding the graphics pipeline as it influences engine design, hardware principles and the relationship to game engine construction, mathematical principles involved in game engine design, scene graph construction and maintenance, texture and materials management, collision systems, physics systems, particle systems, and control systems. Furthermore, this course will examine software and toolsets that assist game engine designers in their tasks. Students will be expected to design and implement a game engine in teams as well as properly document their design and development strategy. (IGME-540 Foundations of Game Graphics Programming)

IGME-560 Artificial Intelligence for Game Environments (3 credits)

This course explores introductory artificial intelligence concepts through both a theoretical and practical perspective, with an emphasis on how to apply these concepts in a game development context. In particular, the course focuses on applying concepts such as search, reactive intelligence, knowledge representation, and machine learning to real-time situations and applications as relevant to the field of entertainment technology and simulation. (IGME-309 Data Structures & Algorithms for Games & Simulations II)

IGME-570 Digital Audio Production (3 credits)

Technologies and techniques for producing and manipulating digital audio are explored. Topics include digital representations of sound, digital audio recording and production, MIDI, synthesis techniques, real-time performance issues, and the application of digital audio to multimedia and Web production. (IGME-202 Interactive Media Development)

IGME-571 Interactive and Game Audio (3 credits)

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)

IGME-580 IGM Production Studio (3 credits)

This course will allow students to work as domain specialists on teams completing one or more large projects over the course of the semester. The projects will be relevant to experiences of the Interactive Games and Media programs, but will require expertise in a variety of sub-domains, including web design and development, social computing, computer game development, multi-user media, human-computer interaction and streaming media. Students will learn to apply concepts of project management and scheduling, production roles and responsibilities, and their domain skill sets to multidisciplinary projects. Students will complete design documents, progress reports and final assessments of themselves and their teammates in addition to completing their assigned responsibilities on the main projects. (Third Year Standing)

IGME-581 Innovation & Invention (3 credits)

In this course, students explore the process and products of innovation and invention. Each term a multi-disciplinary team of students conceives and develops a different "outside the box" project. Readings, projects, scholarly term papers, and pragmatic challenges of collaboration and communication across disciplines provides direct experience of the interplay of technology, human nature, and a human environment in which emerging technologies and new modes of interaction are pervasive and ubiquitous. Artists, natural scientists, social scientists, and technologists are guided through a series of collaborative experiences inventing, designing, implementing and studying emerging technologies. Presentations, projects and individually-written research papers are required. The faculty staff and resources of the Center for Student Innovation are significant assets for this course. (Third Year Standing)

IGME-582 Humanitarian Free & Open Source Software Development (3 credits)

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-583 Legal and Business Aspects of FOSS (3 credits)

The entertainment and software industries are grappling with the impacts of "free software" digital distribution. Agile development, 3D printing, the Internet and other technologies are changing the face of how business is done, as well as what business can charge for and hold onto. Disruptive technologies,

emerging interfaces, and real-time, on demand product creation and distribution are transforming our entertainment, telecommunications and manufacturing landscapes. This course will examine the impacts of these new technologies and the new thinking that are taking us into these new worlds. (IGME-582 Humanitarian Free & Open Source Software Development)

IGME-584 Software Development on Linux Systems (3 credits)

Students will learn how to package software for release and engage in version maintenance within the FOSS community. Topics such as Linux package management, version control systems, potential license conflicts, development vs. production releases, bug tracking, maintenance management, forking, patching and future development will be covered from both a management and end-user perspective in lectures, lab exercises and a project. (IGME-582 Humanitarian Free & Open Source Software Development)

IGME-585 Project in FOSS Development (3 credits)

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 team of hundreds (Mozilla, Java, Linux). This course builds on the introductory experiences provided in the pre-requisite 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 addresses will vary offering to offering, but will be along the lines of those listed above. (IGME-582 Humanitarian Free & Open Source Software Development)

IGME-589 Research Studio (3 credits)

This course will allow students to work as domain specialists on teams completing one or more faculty research projects over the course of the semester. The faculty member teaching the class will provide the research topic(s). Students will learn about research methodology to implement, test, and evaluate results of projects. Students will complete research reports and final assessments of themselves and their teammates in addition to completing their assigned responsibilities on main projects. (Third Year Standing)

IGME-590 Undergraduate Seminar in IGM (2-6 credits)

This is intended to allow for special one-time offerings of undergraduate topics or to allow faculty to pilot new undergraduate offerings. Specific course details (such as the course topics, format, resource needs, and credit hours) will be determined by the faculty member(s) who propose a given special-topics offering. (Varies)

IGME-599 Independent Study (1-6 credits)

The student will work independently under the supervision of a faculty advisor on a topic not covered in other courses. (Enrollment in this course requires permission from the IGM department)

19.2.1 Undergraduate Advanced Elective Project Courses

Several of the Undergraduate Advanced Elective courses are project-based classes. Note that project courses provide an excellent opportunity for developing your portfolio and improving 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. Project courses include:

- IGME-540 Foundations of Game Graphics Programming: 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.
- IGME-580 Production Studio: 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.
 - You can take this course as many times as you want as an undergraduate student. However, 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). Any additional Production and/or Research Studios would count towards their Free Electives.
- IGME-581 Innovation & Invention: “I&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&I.
- IGME-585 Project in FOSS Development: This course is similar to other IGM project courses. However, students focus on the FOSS movement and particular software development practices.
- IGME-588 New Media Team Project: NMID students take this course in their senior year. GDD students are sometimes invited to join the team. This course provides an excellent opportunity to collaborate with New Media Design majors in the design and development of a large-scale project.
- IGME-589 Research Studio: The students work as domain specialists on teams completing one or more faculty research projects during the semester. The faculty member teaching the class will provide the research topic(s). (In IGME-580, the students generate the project ideas.) Students will learn about research methodology to implement, test, and evaluate results of the projects. Students will complete research reports and final assessments of themselves and their teammates in addition to completing their assigned responsibilities on the main projects.
 - You can take this course as many times as you want as an undergraduate student. However, 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). Any additional Production and/or Research Studios would count towards their Free Electives.
- IGME-599 Independent Study: Use this course to pursue something more research-oriented, especially for concepts not explored in-depth in any undergraduate RIT course. You need to contact a professor with a proposal.
 - It is up to the student to find a faculty member, pitch the idea, and develop the Independent Study proposal. Planning ahead by taking classes, visiting office hours, reading Insights, and talking with your faculty and academic advisors will help you

find/generate an Independent Study. There is a form for the Independent Study which you can obtain from a faculty member or your advisor. Our Undergraduate Coordinator will need to approve and sign off on the Independent Study form before you can be enrolled.

19.3 Required Math and Science

For more information, please refer to Section [6.2.6](#).

MATH-131 Discrete Mathematics (4 credits)

This course is an introduction to the topics of discrete mathematics, including number systems, sets and logic, relations, combinatorial methods, graph theory, regular sets, vectors, and matrices. (MATH-101 or equivalent)

MATH-185 Mathematics of Graphical Simulation I (3 credits)

This is the first part of a two course sequence that aims at providing the mathematical tools needed to manipulate graphical objects and to model and simulate the physical properties of these objects. Topics from linear algebra, primarily in two and three dimensional space, analytic geometry, and calculus will be presented. The emphasis is on linear algebra, particularly its application to problems in geometry and graphical systems. (MATH-101 or equivalent)

PHYS-111 College Physics I (4 credits)

This is an introductory course in algebra-based physics focusing on mechanics and waves. Topics include kinematics, planar motion, Newton's laws, gravitation; rotational kinematics and dynamics; work and energy; momentum and impulse; conservation laws; simple harmonic motion; waves; data presentation/analysis and error propagation. The course is taught using both traditional lectures and a workshop format that integrates material traditionally found in separate lecture, recitation, and laboratory settings. Other Electives and General Education

Students have the option to take one of the following Math courses based on their interest and Math Placement Exam score. This would be the third course in the math sequence:

MATH-181 Project-Based Calculus I (4 credits)

This is the first in a two-course sequence intended for students majoring in mathematics, science or engineering. It emphasizes the understanding of concepts, and using them to solve real-world problems. The course covers two-dimensional analytic geometry, functions, limits, continuity, the derivative, rules of differentiation, applications of the derivative, Riemann sums, definite integrals, and indefinite integrals. (ALEKS math placement exam score greater than or equal to 80)

MATH-181A Calculus I (4 credits)

This is the first in a two-course sequence devoted to the study of single-variable calculus. The course includes the same topics as COS-MATH-181, but the focus of its workshop component is different. Whereas workshops attached to 181 emphasize concept development and commonly provide real-world applications, the workshops of 181A emphasize skill development and provide just-in-time review of precalculus material as needed. The course covers two-dimensional analytic geometry, functions, limits, continuity, the derivative, rules of differentiation, applications of the derivative, Riemann sums, definite integrals, and indefinite integrals. (ALEKS math placement exam score between 70 and 79)

MATH-171 Calculus A (3 credits)

This is the first course in a three-course sequence (MATH-171, MATH-172, MATH-173). This course includes a study of functions, continuity, and differentiability. The study of functions includes the definition, representations, and the trigonometric functions. Limits of functions are used to study continuity and differentiability. The study of the derivative includes the definition, the basic rules, and implicit differentiation. Applications of the derivative include problems in related rates and curve sketching. (ALEKS math placement exam score between 60 and 69)

19.4 Graduate Courses in Game Design & Development

Sometimes GDD undergraduate students will have an interest in completing a graduate course in Game Design & Development. In order to enroll in a GDD graduate course, students must have at least a 3.25 cumulative GPA and have written permission from the instructor of the course. Your academic advisor can add you to the course once they have received the permission. Keep in mind taking graduate courses as an undergraduate student may affect Master's degree program requirements (if you are thinking about pursuing the GDD Master's degree at RIT). In addition, you should also speak to Student Financial Services regarding tuition cost of graduate courses.

20 Academic Integrity Policy

RIT has strict a policy on "cheating," which is formally known as adhering to *academic integrity*: <https://www.rit.edu/academicaffairs/policiesmanual/d080>.

The School of Interactive Games and Media requires that students maintain academic integrity in all of their work. Any act of improperly representing another person's work as one's own (or allowing someone else to represent your work as their own) violates academic integrity. These acts include, but are not limited to, plagiarism in any form or use of information and materials not authorized by the instructor during an examination or for any assignment.