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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/. 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 Director and Associate Director, and support staff. Please refer to https://www.rit.edu/gccis/igm/academic-advising-overview.

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 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) and Twitter (@IGMRIT).
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’ll see a link called BS – Game Design & Development. This page has further submenus that contain helpful details about the program. In fact, that’s how you find this handbook 😊 You can view the current program worksheet and course descriptions at https://www.rit.edu/gccis/igm/curriculum.

6.1 What’s 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 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

6.2 General Education Requirements

As you see in the list of courses, you have several liberal arts, science, and math courses, which schools 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 must be filled with courses from the College of Liberal Arts (COLA) or the College of Science (COS 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 worksheet 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. Incoming students must successfully complete or have previous credit for ENGL-150, UWRT-150, or ISTE-110.
This course is part of the LAS Foundations. Please refer to [http://www.rit.edu/programs/undergraduate-graduation-requirements#newgened](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](https://www.rit.edu/academicaffairs/policiesmanual/d015)).

Your major’s WI class is IGME 236. Students have the choice to select their General Education writing intensive course from their Perspectives, Immersion, or General Education Electives—the WI course can fulfill another LAS (general education) requirement. To find all Writing Intensive courses, search SIS for courses labeled with a **writing intensive** (WI) attribute.

### 6.2.3 Liberal Arts

Remember that “LAS” from Section 6.2? 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](http://www.rit.edu/cla). Both sites explain the liberal arts requirements. The College of Liberal Arts sets this curriculum, and they maintain their own advising center on the second floor of the Liberal Arts building. If you have any questions about Liberal Arts transfer credits, Liberal Arts concentrations, 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](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](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/](https://www.rit.edu/cla/academics/navigator/).
6.2.6 Mathematics

See http://www.rit.edu/programs/undergraduate-graduation-requirements#mathsci. You need to take Discrete Mathematics (MATH-131), along with Mathematics of Graphical Simulations I & II (MATH-185 and MATH-186). Students with AP or transfer credit for calculus and/or linear algebra should check with their IGM advisor concerning math and physics options. You may elect to take additional math and science courses, via your general education electives or free electives.

6.2.7 Other General Education Courses

GAMEDES-BS has five open general education electives that you can fill with any course considered part of RIT’s general education classification (typically math, science and liberal arts).

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 finish pre-requisites for future electives outside of IGM. Sometimes students use free electives to pursue a minor or in anticipation of graduate school in another field.

General Education electives: Although more restrictive, these electives could help you take pre-requisites of advanced LAS or Immersion courses. At the least, they 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.

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, 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.

6.4 YearOne

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

6.5 Wellness

Please refer to http://www.rit.edu/programs/undergraduate-graduation-requirements#wellness.
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 advisors 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 a minor (https://www.rit.edu/gccis/igm/igm-minors-overview) or double major (https://www.rit.edu/gccis/igm/cop-and-double-majors).

6.8 **When to Take What**

Please refer to your course worksheet, which we also post the current year’s worksheet at [https://www.rit.edu/gccis/igm/curriculum](https://www.rit.edu/gccis/igm/curriculum). The IGM office keeps an updated electronic copy of your worksheet. See also [https://www.rit.edu/gccis/igm/bs-game-design-development-overview](https://www.rit.edu/gccis/igm/bs-game-design-development-overview).

For the first two years, students in all of the GDD programs 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, 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 together 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.
- **Third year**: students finish the IGM core and specialize via their electives. In addition, you will choose a Liberal Arts Immersion and will begin taking free 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 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. And so, 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’ll find many courses closed.

To enroll for courses online, visit the **Student Information System** (SIS, [https://sis.rit.edu](https://sis.rit.edu)). You will be assigned a particular date and time that enrollment becomes open to you. This date 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’ll 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 Accomodations

RIT provides support for students with disabilities. For more information, please refer to http://www.rit.edu/studentaffairs/disabilityservices/accommodations.php.

9 Grading

Please refer to http://www.rit.edu/~w-policy/sectionD/D5.html 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 http://www.rit.edu/~w-policy/sectionD/D17.html.

10 Final Exams

We are frequently asked about final exam conflicts. Ensure that you check SIS (https://sis.rit.edu) for the final exam schedule and with your instructor to ensure you actually have one. 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 http://www.rit.edu/~w-policy/sectionD/D11.html.

11 Leaving a Course

Sometimes 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) 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 below.

11.2 Withdrawing

If you withdraw from a course between the second week and the twelfth 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 consequences that may come with withdrawing from a course. You cannot withdraw past the twelfth week of class, which means that you need to decide before the end of the twelfth week whether or not to withdraw from a course. In terms of finances and course withdrawals, please refer to http://www.rit.edu/~w-policy/sectionD/D6.html.

11.3 Failing

If you don’t officially drop or withdraw, but simply stop submitting work, you will likely earn an “F” for the course, which becomes part of your official transcript at RIT, lowers your GPA, and may restrict financial aid, among other potential consequences. If you are feeling 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 just let things slide, you should refer to Section 13 on probation and suspension.

11.4 Incompletes

In rare cases, you might have extenuating circumstances, e.g., medical problems. As explained in Section II.B of http://www.rit.edu/~w-policy/sectionD/D5.html, 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. And so, 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/or 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. 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

Although no one wants to consider this option in too much detail, you should be aware of the procedure when you have academic trouble. To maintain good standing in Game Design & Development 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 (http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D5_1.html), 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 notice that warns you of this fact. If any of these GPAs is below 2.0 for a second semester (at any time), then you will receive a second probation notice. 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: don’t 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 advisors or your faculty advisor. They will be able to advise 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/~w-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 http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D2_1.html. There are also financial implications depending on when you decide to take a Leave of Absence:

- http://www.rit.edu/fa/sfs/refund
If you are considering taking a voluntary Leave of Absence, please contact your academic advisor. All voluntary Leaves of Absence must be approved by the department.

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 the GDD concentration level.

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 web site 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 on Job Zone. You cannot enroll in co-op on SIS—you must register on the Co-op Office’s Job Zone website (referred to below). This process prompts the School of IGM office to enroll you on SIS.

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

You must complete two blocks of co-ops, and the absolute minimum for one co-op block is 350 hours. How you get to this number may vary depending on the type of opportunity you accept, but this number is calculated based on a 35 hour work week for a minimum of 10 weeks. 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. Do not quit once you have hit 10 weeks! If you do, and we receive a complaint from your employer, you may lose the entire co-op credit. Please see your advisor for more information.
To report your co-op or to obtain approval for a co-op you found outside of JobZone, 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 filling out a waiver form (contact your IGM academic advisor) and having your manager send a corroborating letter on company letterhead to the School (details are included in the form).

For more information about co-op, contact Annette Stewart (585-475-5466, aksoce@rit.edu). She is the co-op liaison assigned to the Game Design & Development program, and she can be a great help in your search for a co-op job.

15 Applying for Graduation

Once you have earned over 90 credits you will be eligible to apply for graduation online. You will be sent an email from the Registrar’s Office with instructions on how to apply. This means it is your responsibility to apply for graduation and update the name on your diploma and the address where the diploma will be mailed. It is recommended 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 date 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’ll be able to graduate in the timeframe you expect.

After the grades are submitted for the semester in which you expected to complete your degree requirements, we will look at the credits you’ve earned since the time you applied for graduation and check them against what you had left at that time. If you’ve filled in all the blanks, we’ll certify you for graduation! If not we will send you a “lack letter,” which lists what you lack for graduation. 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 go by without any registration activity from you (you don’t register for 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 program through the Admissions office. In that case, you might end up losing some credits because you’ll be reapplying for the curriculum as it stands at the time you reapply, not the curriculum you came in under originally. Bottom line: don’t put off finishing that last course or two, and keep the School of IGM informed about where you are and what your plans for graduation are.

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 create an electronic Game Design & Development worksheet for you (and give you a copy too, of course). The current academic year’s worksheet 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 curriculum 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

Finally, we need to discuss the expectations we have for students in the Game Design & Development program. These expectations fall into two general categories, effort and ethics, and are critical to your academic survival that you understand and meet them.

We’ll start with effort. To graduate from the GDD program, you’ll 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’s because it is a full-time job. That’s why they call it being a full-time student.

To be sure, 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’ve 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.

The ethics expectation is equally important. GDD 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’ll find that ethics is a topic in most of our courses, so you certainly will have ample opportunity to learn what ethical behavior is. Having the guts to behave ethically ultimately falls on your shoulders.

In an academic setting there is one ethical issue that is vitally important from the first day of classes: academic integrity (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 you feel comfortable with. Also, if you are feeling overwhelmed with your classes and don’t think you’ll be able to make a project deadline, talk with your instructor or advisor about what’s going on, and don’t succumb to the temptation to cheat. In short, don’t place your academic career in jeopardy!

18 Intellectual Property

A common question we get is if students own the work they do in class or perhaps outside of class using RIT resources. Please refer to Section 5.D of http://www.rit.edu/~w-policy/sectionC/C3.html. In general, students will usually own what they create, though they need to be careful concerning educational software licenses. We recommend that students coordinate with MAGIC (http://magic.rit.edu), the
19 Course Descriptions

Below you will find course descriptions for all GDD 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. In addition to the listing below, we strongly encourage students to review the descriptions and associated on the official registration website, https://sis.rit.edu.

19.1 GDD 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. (Grade of "C-" or better in IGME-105 Game Development and Algorithmic Problem Solving I)

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.

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)
This course introduces students to the practice of media programming for the development of highly interactive user experiences in games, simulation, education, and entertainment. Students learn to manage and edit a wide variety of digital media types, e.g. still- and motion-graphics, text, audio, and video. Students develop applications to allow users to access, control, and manipulate each of these media types. This course will require programming projects. ((Grade of “C-” or better in IGME-102 New Media Interactive Design and Algorithmic Problem Solving II or Grade of “C-” or better in IGME-106 Game Development and Algorithmic Problem Solving II) & MATH-185 Math of Graphical Simulations I)

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. (IGME-202 Interactive Media Development, PHYS-111 College Physics I, & 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. (IGME-202 Interactive Media Development)

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 & MATH-186 Mathematics of Graphical Simulation II)

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-202 Interactive Media Development & IGME-230 Website Design & Implementation)

19.2 Game Design & Development Advanced Electives offered through IGM

GAMEDES-BS students are required to complete 12 credits of Advanced Electives. Students are encouraged to complete these courses through IGM offerings, coded as IGME courses in SIS. However, students do have the option to complete no more than 50% of their advanced electives through the College of Imaging Arts & Science (CIAS) and the B. Thomas Golisano College of Computing & Information Sciences (GCCIS). Typically 200-500 level courses in CIAS and 300-500 level courses in GCCIS may meet Advanced Elective criteria. If a student is considering completing an Advanced Elective outside of IGM, they must seek approval through their advisor by providing reasoning why a particular course will meet their personal and/or professional objectives.

The following IGME courses have been selected as advanced GDD electives. You may choose any courses from this list for your advanced electives. However, some courses have prerequisites that are not in the GDD core, so be careful to plan for the prerequisite courses if needed. This list changes as new courses are created. Also, in some cases, other courses may be accepted as a substitute for one of your advanced GDD electives. Check with your advisor.

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)
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>IGME-431</td>
<td>Digital Video for the Web</td>
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<td>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 &amp; IGME-230 Website Design &amp; Implementation)</td>
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<td>IGME-440</td>
<td>Online Virtual Worlds &amp; Simulations</td>
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<td>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 &amp; MATH-186 Mathematics of Graphical Simulation II)</td>
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<td>IGME-450</td>
<td>Casual Game Development</td>
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<td>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-330 Rich Media Web Application Development I)</td>
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<td>IGME-451</td>
<td>Systems Concepts for Games and Media</td>
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<td>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 &amp; Algorithms for Games &amp; Simulations II)</td>
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<tr>
<td>IGME-470</td>
<td>Physical Computing &amp; Alternative Interfaces</td>
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<td>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-202 Interactive Media Development)</td>
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<tr>
<td>IGME-529</td>
<td>Foundations of Interactive Narrative</td>
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<td>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)</td>
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<tr>
<td>IGME-540</td>
<td>Foundations of Game Graphics Programming</td>
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<td>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 &amp; Algorithms for Games &amp; Simulations II)</td>
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<tr>
<td>IGME-550</td>
<td>Foundations of Game Engine Design and Development</td>
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<td>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</td>
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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 & First & Second Year Core Completion)

**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. (Third Year Standing)

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 department offering the course)

19.3 Required Math and Science

For more information, please refer to Section 6.2.6.

MATH-131   Discrete Mathematics   (4 credits)
This course in 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)
MATH-186  Mathematics of Graphical Simulation II  (3 credits)
This is the second 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 analytic geometry and calculus, as applied to geometric and physical simulations. (MATH-185)

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

Please refer to Section 6.2.

20 Academic Integrity Policy
RIT has strict a policy on “cheating,” which is formally known as adhering to academic integrity: http://www.rit.edu/~w-policy/sectionD/D8.html.

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.