



MARYMOUNT
UNIVERSITY



Cloud Computing, Data Science,
and Game Design and Development:
A Guide to the Newest Specializations
in Information Technology

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About this Resource

The information technology boom is nowhere near over, in fact, many believe it is just beginning to gain momentum. The accelerated pace of new technology development and the continually emerging applications of these technologies to virtually every industry means that new specialized sectors within the larger field are demanding qualified professionals to meet their needs.

To fulfill this need for information technology professionals with career-ready specialized skills, Marymount University has added three new specializations to its bachelor's of Information Technology program. With this resource, the professionals at Marymount University's School of Business and Technology hope to expose students to the field of information technology in greater depth, identify what it means to choose to pursue a degree in this discipline and explore Marymount University's BS in IT degree. We will also take a deep dive into these new and emerging specializations within information technology – Cloud Computing, Data Science, and Game Design and Development – and explore how these subfields are shaping today's IT world.

Defining Information Technology

Information technology, also commonly referred to as IT, is a rapidly-evolving and expanding field that is changing the way every individual – and every industry for that matter – interacts with computers, their systems, and their components. A multifaceted discipline, information technology includes the design and creation of computer and telecommunication systems, their installation, maintenance, security, and support, as well as the management, storage, analysis, and interpretation of data collected by these systems.

The field of information technology is unique, in that it is not limited to the above description, because **information technology, as a discipline, is constantly evolving as new technologies emerge and new threats to security arise.** As long as technology continues to become increasingly integrated into our modern lifestyle, there will continue to be a need for professionals in this field.

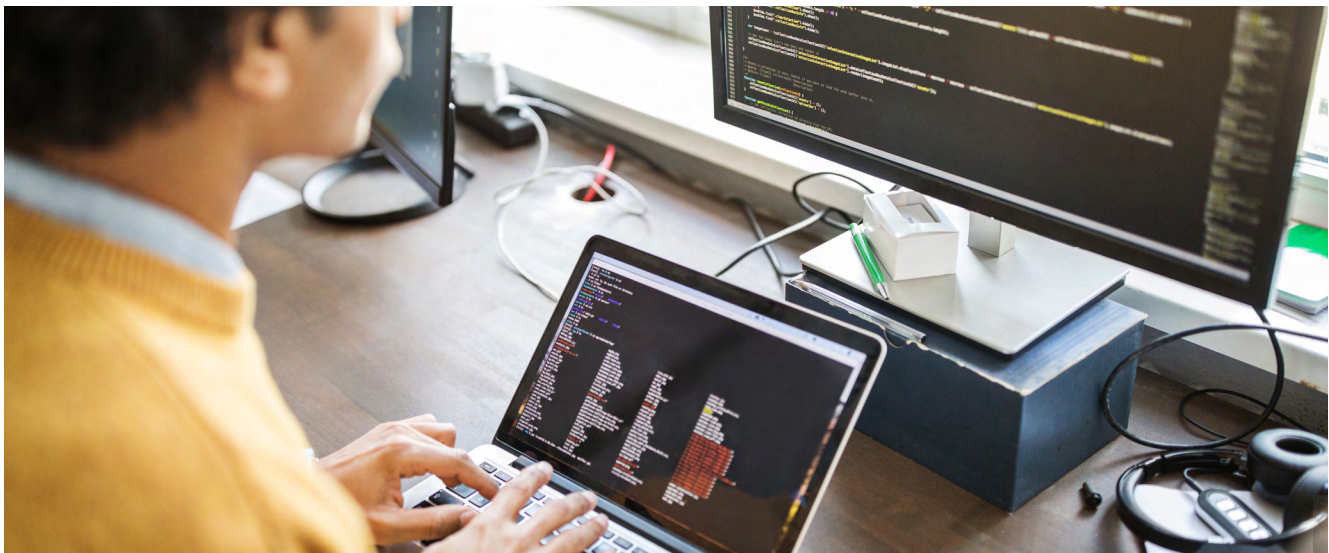
Those who are interested in tackling emerging and developing challenges as they relate to technology, who have a passion for data and analysis, who are comfortable with computer programming and communications are the kinds of individuals who should consider pursuing a bachelor's degree in information technology.



How to Choose Information Technology

The college application and decision process comes with a whole set of challenging questions and choices, one of the most important being – what will you study? Making that determination can seem overwhelming, but it does not need to be if you're considering a tech-related degree.

To help you, we have put together several questions you should ask yourself when deciding if an undergraduate degree in information technology is right for you. Use these alongside your other resources (teachers, advisors, parents, research, etc...) to guide you as you make your decision.



Do you need to know about the latest technology and have a passion for continuing to learn about developments in the IT field?

There's no question, we are living in the middle of a technology explosion, and it is not slowing down anytime soon. Because the field of information technology is growing and expanding so rapidly, those who choose to earn a degree in it will likely need to continue their education throughout their professional years with training, certifications, and self-guided exploration. IT requires continued education to stay up-to-date on the latest technological developments and integrations.

Do you enjoy communicating with individuals to solve problems and create better user experiences?

At the end of the day, information technologists work for an end user (a client). It is their job to make sure that the systems and networks they have put in place are functioning properly and meeting the needs of the user. Information technology professionals must be comfortable tackling problems head-on and working until they are resolved.

Are you comfortable with hands-on work and multitasking?

Much of the day-to-day work of an information technologist includes the set-up, maintenance, optimization, programming, and troubleshooting of computers and network systems. Frequently, this will mean working remotely and on-site with clients to meet their needs and resolve one or many issues that arise. Information technology professionals should be comfortable working to resolve multiple issues at the same time while prioritizing them according to urgency and the client's wishes.

In addition to considering these questions, individuals considering a bachelor's in information technology are likely interested in one or more of the following topics:

- Computer software and hardware
- Computer systems engineering
- Web development and software applications development
- Network and database administration
- Data storage and management
- Cybersecurity

Along with common interests, those considering a bachelor's in information technology should also possess certain traits. While you don't need to have every one of these, counting several of these skills as your strengths will serve you in a future professional career:

- Critical and logical thinker
- Clear communicator
- Skilled at information gathering
- Able to analyze and interpret data
- Persistent in problem-solving
- Organized and methodical



Exploring Marymount University's Bachelor's of Science in Information Technology

Offered through Marymount University's [School of Business and Technology](#), the [Bachelor of Science in Information Technology](#) degree program prepares students to meet the evolving technological needs of every sector but specifically health care, the sciences, engineering, business, entertainment, and education.

The School of Business and Technology is located in the brand new, state-of-the-art Ballston Center building, just minutes outside Washington D.C. Home to the FBI, DIA, Department of Defense, and countless other agencies and organizations, our proximity to Washington D.C. complements our student-focused, hands-on curriculum and provides unparalleled opportunities for experiential learning through internships, service learning, study abroad, and community engagement.

A Look Inside Marymount's IT Curriculum

The undergraduate degree program begins with Marymount's [Liberal Arts Core curriculum](#). Grounded in a liberal arts education, students walk away from their undergraduate years well-rounded and well-prepared for their professional careers. Students learn transferable skills and grow both academically and personally through inquiry-based learning experiences, exposure to global perspectives, and an opportunity for experiential learning through an internship or research project.

The required major coursework for the information technology degree is designed to provide students with a comprehensive overview of the field, as well as hands-on learning experiences that will enable them to translate IT theory into practice. Students will take courses such as:

- Information Technology in the Global Age
- Cybersecurity Principles
- Software Engineering
- Computer Networking
- Database Technology
- Software Quality Assurance, Documentation, and Testing

Students will also participate in three IT seminar courses throughout their undergraduate degree, as well as a capstone project and an internship during their senior year. Each of these courses offers students the opportunity to translate their coursework into a tangible experience, reinforcing the information technology principles they have learned throughout their time in the program. Upon graduation, students are well-equipped to immediately begin a career in information technology in government or industry.



Unique Features of Marymount's Information Technology Degree

Marymount's Information Technology undergraduate program is widely recognized as a leader in Washington D.C. and the surrounding area and is a strategic choice among prospective students for many reasons. Here are just a few aspects of Marymount's undergraduate IT program that make it an excellent choice for forward-thinking college students who see themselves working in a tech-focused field:

Internships

Internships provide professional experience and the chance to use classroom-acquired knowledge in a real-world setting. All undergraduates are required to participate in one internship course and typically do so in their senior year. Recent Information Technology students at Marymount have interned with renowned organizations such as:

- Booz Allen Hamilton
- Department of Justice
- National Defense University
- Sirius XM Radio
- The Washington Post Digital
- Raytheon

Hands-On Learning Experiences

Students are encouraged to work on their own computers and in specifically designed high-tech spaces including:

- Designed Gaming Lab
- Cyber Lab

Opportunity for Global Study

Together with the [Center for Global Education](#), students have the opportunity to study abroad – acquiring a global self-awareness, exploring new perspectives, appreciating a wide breadth of cultural diversity, and understanding in greater depth their social responsibility and commitment to service. Some of the places our IT students have recently traveled include:

- Dublin, Ireland
- Tallinn, Estonia & Helsinki, Finland
- Prague, Czech Republic
- Abu Dhabi and Dubai, United Arab Emirates

Marymount's B.S. to M.S. Degree Programs

Marymount offers two options for undergraduate students looking to continue their education by earning a complementary master's degree with as little as one year of additional study. A B.S./M.S. in Information Technology and a B.S. in Information Technology/M.S. in Cybersecurity are offered as a five-year option for qualified students. Students must maintain a high GPA throughout their undergraduate and graduate studies and should be well prepared for advanced coursework in their area of expertise.

- [B.S./M.S. in Information Technology](#)
- [B.S. in Information Technology/M.S. in Cybersecurity](#)

Information technology and cybersecurity are two of the fastest growing fields in our world today. These professionals are challenged to address complex problems many of which have extensive ramifications in regard to security and privacy. These challenges require professionals who are expertly trained in their field, excel in their studies, and have a passion for these subjects.



Marymount's IT Specialty Degree Tracks

To meet the undergraduate degree requirements, students will need to select a specialization and typically declare this during their sophomore year. These specializations are designed to tailor the undergraduate degree to fit an individual's interests and career goals. They focus on one specific area within the larger fields of information technology and related disciplines and are comprised of four to six courses.

Students can take more than one specialty and increasing numbers are doing so due to an increasingly competitive workforce. These specializations will give you a competitive edge and the skills and experience future employers want to see in their next hires.

These are the specializations currently offered to undergraduate information technology students:

- [Applied Cybersecurity](#)
- [Applied IT](#)
- [Cloud Computing](#) *New
- [Computer Science](#)
- [Data Science](#) *New
- [Forensic Computing](#)
- [Game Design and Development](#) *New
- [Information Systems](#)
- [Interactive Media](#)
- [Networking and Cybersecurity](#)

Marymount University recently made three new specializations available to undergraduate IT students: Cloud Computing, Data Science, and Game Design and Development. Across the industry, there is a growing need for information technology professionals with specific skills in these



Cloud Computing



Data Science



**Game Design and
Development**

Deep Dive: Specialty in Cloud Computing

Many smartphone users today are benefiting from the cloud. Whether that is expanding their storage to save more photos or backing up their emails and text messages, the cloud services offer a convenient, safe way to get more out of your devices.

But beyond personal use, cloud services and platforms have evolved to cater to the needs of businesses and larger organizations. The overwhelming majority of businesses are choosing to utilize cloud computing, as opposed to storing their information through an on-premise solution.

Cloud computing is one of the fastest growing technology fields with an abundance of jobs in the Washington D.C. area – a major hub for data centers supporting cloud providers such as Amazon, Microsoft, and Google. Through this specialization, students will gain a solid understanding of cloud technologies and its operation, including selection, operations, and security.

96% of virtually
all organizations
use **cloud computing**

What is Cloud Computing? Why is it Relevant to Modern Technology?

Cloud computing is the ability to run applications, support business operations, store and protect data, and perform a host of other computing functions through an online, offsite web server, as opposed to a traditional on-premise hardware network.

Essentially, businesses pay a vendor to house and maintain their computing services for them, a practice which offers several [advantages](#) including:

- Ease of access
- Affordable and predictable costs
- Increased security
- Outsourced troubleshooting
- Faster deployment
- Unmatched speed

By 2020 the cloud
computing market
is expected to top
\$411 BILLION

Each of these advantages offers flexibility to the organization, which in turn drives creativity and innovation. Cloud computing is no longer seen as new on the technological stage but has been embraced as the new normal for most businesses and industries. Increasingly, those who pursue a career in information technology are finding that **having a basic understanding of the principles of cloud computing, offers them a competitive edge in the workplace.**

Furthermore, the portion of budgets being allocated for cloud computing services continues to expand and is [forecasted to grow](#) from 19 to 28 percent by 2022. As competition grows among businesses, many are turning to cloud platforms and outsourcing computing services, thereby cutting costs and increasing flexibility. This means the importance of information technology professionals with cloud computing skills will only continue to grow over the coming decades.

Marymount's Specialization in Cloud Computing

Marymount University's [specialization in cloud computing](#) builds on the principles and core curriculum of the information technology undergraduate degree. Students who elect to specialize in cloud computing will take four additional courses, designed to train them in the fundamentals of this area. The courses included are:

- Operating Systems and Virtualization
- Cloud Computing
- On-Premise and Cloud System Administration
- Data in the Cloud.

Students will then apply this knowledge in their internship and capstone project. Upon completion of the specialization, students will have a solid understanding of architecting, developing, and managing systems in the cloud computing environment. They will walk away able to communicate effectively about their career-applicable knowledge of cloud computing platforms, and the operation and administration of these systems. Students will also acquire hands-on experience with IaaS, SaaS, and PaaS systems, which translates directly to marketable professional skills.



Career Opportunities

If you are looking to land an IT job with a focus on cloud computing, you will need to become proficient in certain skills. You will acquire many of these skills through the IT curriculum and the specialization courses, but you can also look into outside certifications to boost your credibility and competency. Marymount's specialty track will start you off with a solid understanding in areas like:

- Machine learning and AI
- Serverless architecture
- Cloud migration
- Programming skills
- Database skills
- Information Security
- (Sources: [CloudTech](#) and [Simplilearn](#))

Some entry-level IT positions for individuals possessing cloud computing skills include:

- Cloud Consultant
- Cloud Architect
- Software Developer
- Cloud Tech Support Specialist
- Applications Developer

Compared to all IT professionals, not only are those with cloud computing skills in [higher demand](#), but they also earn the highest salaries on average. The salary range for these entry-level information technology positions varies based on prior work experience, which is why Marymount prepares its students to qualify for the most competitive positions with an internship during their senior year. Students are also encouraged to acquire employment outside the internship, during their summers.

Average salary – [\\$72,200](#)

Deep Dive: Specialty in Data Science

Data science is another fast-growing part of the information technology field. With the massive increase of data that is being stored and collected, **the need for qualified professionals to collect, analyze, and store that data is becoming crucial.**

Commonly referred to as “Big Data”, it has become enmeshed into our everyday lives. You probably interact with these large amounts of data on a daily basis, and you might not even know it! [Mobile maps and GPS, online shopping, and wearable technology](#) are only a few of the many contributors to the data boom.

By 2020, the accumulated volume of big data will [increase from 4.4 zettabytes to roughly 44 zettabytes](#) or 44 trillion GB.

As the number of smartphone and smart device users grows rapidly worldwide, so does the amount of data that needs to be managed. Besides personal use, analysis of this data is now widely used in business, medicine, and entertainment (e.g. sports). Industries have embraced the fact that data gathering and interpretation have become a normal part of operations and are now looking for trained, career-ready professionals with the skills and experience needed to manage this data.

This specialty prepares students to enter the data science field in the role of a data engineer or data analyst. Through this specialization, students will gain a solid understanding of data science and analytics, including data acquisition, data wrangling, data analysis, and data visualization.

By 2020 **big data**
will increase from
44 ZETTABYTES to
↑ 44 TRILLION GB

What is Data Science? Why is it Relevant to Modern Technology?

Understanding how to analyze and interpret data has become essential in almost every industry, for businesses large and small, private and public alike. As technology continues to integrate into all aspects of business operations, managers and executives are realizing the importance of having knowledgeable professionals on their team who specialize in gathering and interpreting data.

Businesses want to capitalize on the data they collect and make educated, strategic decisions that will result in a profitable return-on-investment. But many businesses are finding that they need help managing their data. In fact, according to the [2018 Data Security Confidence Index from Gemalto](#), 65 percent of the businesses polled said they [couldn't analyze or categorize](#) all the data they had stored.

This is where the role of data scientists becomes essential. Qualified professionals with a background in both information technology and data science, can step into this emerging role to meet the needs of Big Data today. Additionally, businesses realize that adding data scientists to their staff means a better bottom line, as [89 percent of businesses polled](#) knew that by analyzing their information properly, they'd have a competitive edge.

Marymount's Specialization in Data Science

Marymount University's [specialization in Data Science](#) builds on the principles and core curriculum of the information technology undergraduate degree. Students who elect to specialize in Marymount's Data Science will take four additional courses, designed to give them the proficiency to confidently secure entry-level positions in the field of data science. The courses included are:

- Data Analytics
- Managing Big Data
- Current Topics in Data Science (including visualization)
- Data Science Applications

Upon completing the specialization, **students will have a solid understanding of the principles of statistical science as it applies to data**, including describing, comparing, and grouping data, as well as identifying trends within data sets. Students will develop strong problem-solving skills, as they learn to survey and sample data. They will also develop clear and concise communication skills as they learn to summarize and effectively relate their work.



Career Opportunities

If you are looking to land an IT job with a focus on data science, you will need to become proficient in certain skills. You will acquire many of these skills through the IT curriculum and the specialization courses, but you can also look into outside certifications to boost your credibility and competency. Marymount's specialty track will start you off with a solid understanding in areas like:

- Programming
- Statistics
- Data Visualization and Wrangling
- Software Engineering
- Data Intuition
- (Source: [Towards Data Science](#))

Some entry-level IT positions for individuals possessing data science skills include:

- Data Visualization Analyst
- Junior Modeling and Data Analyst
- Artificial Intelligence Data Scientist
- Operations Research Analyst
- Data Replication Administrator

Compared to all IT professionals, data scientists are competitively compensated based on their education and work experience. In the field of data science, work experience is particularly necessary. **At its heart, data science is using problem-solving and critical thinking to address the practical challenges of businesses.** Data science is also a requirement for any work in artificial intelligence. Students will be best prepared to land their dream job by exposing themselves to as much research and hands-on practice as possible. All experience, both professional and self-guided, can demonstrate your competence to a future employer.

Average salary – [\\$69,000](#)



Deep Dive: Specialty in Game Design and Development

The video game industry has seen massive growth over the last decade, since the introduction of the smartphone in 2007 and the rise and development of mobile gaming. This highly profitable industry has gained significant momentum, particularly in the past few years and increasing numbers of current and prospective college students are showing an interest in gaming as a profession.

Gaming combines skills from several fields including computer science, programming, and graphic design. Recent developments in gaming also involve an intersection with artificial intelligence, virtual reality, and augmented reality. Games are being designed and developed for several existing platforms (PCs, consoles, mobile devices) and being developed and enhanced for emerging platforms and purposes other than recreation.

In 2018, the **global video game market generated \$134.9 BILLION, up 10.9% from 2017.**

What is Game Design and Development? Why is it Relevant to Modern Technology?

A favorite activity for students in the field of information technology, game design and development has established itself as a legitimate field of study, which offers students the opportunity to enter either the gaming industry or other software fields.

Although gaming for personal recreation is a wildly popular and lucrative past-time, **the wide-spread prevalence of technology in industry and education points to more applications for games and game design.** Gaming is emerging as a tool to be used in education, [healthcare](#), defense, first responder training, and more. Because of the sheer number of gamers, crowdsourcing has become a popular means of real-world problem-solving, [through games like Foldit and Minecraft](#).

Marymount's Specialization in Game Design and Development

Marymount University's [specialization in Game Design and Development](#) builds on the principles and core curriculum of the information technology undergraduate degree. Students who elect to specialize in Game Design and Development will take four additional courses, providing them with the skills they need to gain entry-level positions in the field of game design and development or software development. The courses included are:

- Game Design
- Story and Narrative Development for Video Games
- 3D Modelling and Animation
- Game Development and Production **or** Mobile Gaming

The specialty focuses on the gaming genre, preparing students to design and develop games for work and play. With a particular focus on the development aspect of gaming, students use the frameworks and tools that are commonly used in the industry today. **At the end of the program, students will have a fully functional game that can be demonstrated to future employers.**

Each course in the specialization combines theory with practical hands-on exercises. To ensure this, students have access to a specially designed game lab in Ballston. To further support hands-on-learning and a culture of innovation, creativity, and pursuit of excellence within the field of game design and development, Marymount University is putting together e-sports teams, including an all-girls team.

Career Opportunities

If you are looking to land an IT job with a focus on game design and development, you will need to become proficient in certain skills. You will acquire many of these skills through the IT curriculum and the specialization courses, but you can also look into outside certifications to boost your credibility and competency. Marymount's specialty track will start you off with a solid understanding in areas like:

- Computer Animation
- Software Development
- 3D Modeling
- User Interface Design
- Storytelling
- (Source: [GameDesigning](#))

Some entry-level IT positions for individuals possessing game design and development skills include:

- User Interface Programmer
- Entry-Level Software Engineer
- UX Designer
- QA Tester
- Gameplay Programmer

Like other specializations in the information technology field, game designers and developers are compensated according to their level of experience and their ability to demonstrate their competency in the field. However, unlike other specializations, those who specialize in game design can frequently best demonstrate their expertise through their portfolio of work. In addition to specialized coursework, students who spend a great deal of time designing, developing, analyzing, refining, and, yes, playing games of their own creation are often rewarded with the best entry-level positions.

Average salary – [\\$57,650](#)



Additional Resources

Deciding what to study in college is a big choice, but if you are interested in information technology, there is a bright future ahead of you. If you have any questions about the IT field, Marymount's own Bachelor of Science in Information Technology, or the specializations we offer – please don't hesitate to [reach out](#). We are more than happy to speak with you and are excited to support you in the next chapter of your academic career.

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