10 Analytics / Data Science Masters Program by Top Universities in the US

BIG DATA BUSINESS ANALYTICS MACHINE LEARNING

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Introduction

Doing Post-graduation in the United States of America (USA) is a**dream** of countless students across the world. Every year, million of students worldwide appear in examinations like GREs, SATs, TOEFL with a hope of studying in the top US universities. Only a small percentage of these applicants get through!

Qualifying for studying Analytics / Data Science as a post graduate course in US is not easy. But it's not impossible either. I recently got selected in 2016-2018 batch for MS in Data Science at Columbia University. So, I thought I will share my learnings and research with our community.

Why study in the US?

Before starting the research, you should be asking this. If you follow this field closely, the answer should be obvious. US is the largest analytics / data science market in the entire world. The major benefit of pursuing Masters in US is to gain access to the large pool of upcoming job opportunities in US. It is also one of the most mature market in analytics / data science evolution.

If you've ever dreamed of working as a data scientist in US, this guide with take you a step closer. In this article, I've provided a detailed analysis of 10 good MS Programs in Analytics /Data Science in US. I've seen that people become clueless in choosing the best college / university for themselves. Therefore, I've also provided a detailed explanation of selection parameters which can be used to evaluate goodness of any university program.

Note: This is not an exhaustive list. I've only listed the best universities which one should consider which applying for analytics programs in US.

How to decide if a Program is Good ?

Before jumping into the programs, I would like to discuss some aspects which you should consider while judging a program. There is no absolute ranking among programs because each program is stronger / better than others in some aspects. So, choosing a university completely depends on your preference and choice of parameters as described below:

1. **Program Name**
   - The traditional philosophy – 'Don't judge a book by its cover' works in this case as well. Since these are non-traditional programs, you'll find all sorts of names like Masters in Analytics, Masters in Business Analytics,Masters in Data Science, Masters in Predictive Analytics, Masters in Marketing Analytics, Masters in Information Systems, etc.
   - Trust me, names can be very misleading. Though, they do give some idea, but this should definitely be your last concern, if at all!
2. **Curriculum**
   - I believe this is the most important aspect and the first thing which you should check out.
   - The curriculum actually tells you what subjects you'll be studying and straight away gives an impression about the relevance of the program for you.
   - Typically, coursework is divided into core courses (compulsory courses) and electives. You should also check out the list of courses from which you can choose the electives.
   - Curriculum flexibility i.e. the ratio of elective courses, is another important factor. It can vary from as high as 60-70% in some course to almost none in others.
   - Universities also have a provision to wave off some core courses if you're already experienced in them. But you should talk to existing students and try to figure out how easy this is and how easily the faculty approve this.
3. **Practical Training Opportunities**
   - Practical training typically comes in the form of internships, capstone projects, weekend hackathons, etc.
   - Given that data science is a highly application-oriented domain, practical training would play a crucial role in your overall development.

- Location plays a pivotal role in practical learning opportunities outside the campus.
- While you are in the program, location can have academic impact in terms of getting good internship opportunities. Also, a strong data science community gives access to specialized skill meetups and hackathons. For instance, the data science communities in cities like New York or Silicon Valley will be much stronger than other suburban locations.
- After the program, a good location definitely helps in the job search as there will be ample of employment opportunities.

4. **Industry Collaborations**
   - Since most of the programs in data science related courses are professional, industry collaborations will play a key role in your experience through the program.
   - You should check out the particular companies, which domain they belong to, what sort of activities are conducted like technical talks, research collaboration, capstone projects, etc.
5. **Research Opportunities**
   - Though most of the programs are professional in nature, you should understand that research forms an important component of the analytics industry in US. If you're interested in doing some research in data science, some of the programs offer this option as well.
   - You should consider the faculty in your area of interest, read about ongoing research projects, government of industry sponsored research opportunities, etc.
6. **Class Profile**
   - You prospective colleagues will play a crucial role in your learning because you will invariably have various collaboration opportunities where you'll learn a lot from your peers.
   - A careful examination of the profiles of people who also got selected into the program will help you in evaluating your credentials for the program and you'll also get an idea of the quality of people you can expect.
   - Some universities may directly share this information or else you've to check it out via LinkedIn or Facebook.
7. **University Reputation (Rankings)**
   - This factor is important in general but more so for the data science programs. This is because most of them are relatively new, i.e. around 2-4 years old and it's difficult to establish credibility in the industry in such a short duration.
   - Thus, the university brand name plays a key role on how your candidature will be perceived in the industry after completing the degree. No doubt, your knowledge would always matter more, but university reputation plays a crucial role for new courses.
   - You should specifically check out the ranking of the universities in Statistics, Computer Science and Business because these are the three main pillars on which data science and analytics courses are built.
8. **Return on Investment**
   - Post-graduate education in the US is expensive and most of the data science programs will not offer any financial aid. As a matter of fact, some universities treat such programs as cash cows and use them to make money.
   - One important thing to check is the tuition fee of the program as compared to similar programs in engineering like an MS in Computer Science or an MS in Statistics. If there is a big difference, its probably because the university is using this professional program to make money.
   - Please note that when I say cash cow, I don't mean to place it in a negative sense. There is a big demand for data scientists in the US and there are very high chances of you getting a good job after the program even if you do it from a tier 2 college. So its like a win-win situation. You get the experience with the best faculty in the country, you pay a price for it and you get the return as well. Its a good bet if you're not the research focused person and not interested in the traditional research oriented programs.
9. **First Hand Experience**
   - First step is obviously to log onto the program website and check its details. You can do a first level filtering based on the evident information on website.
   - But, an equally important aspect is to talk to people who are already studying there and its alma mater. You can definitely apply to all the colleges you like, but for making the final choice, I can't over-emphasize the importance of this step.
   - This gives you a true picture about the college administration and recognition in the industry, which is really hard to judge from any university's website. Also, given that these programs are mostly new, the

amount of discussions on third-party websites like Quora are also limited.
- If you're wondering how to find these people, again LinkedIn and Facebook are your best friends!

Analytics / Data Science Programs by Top Universities in the US

Having understood the key parameters we should keep in mind while evaluating a masters program, lets consider **some of the good programs** that I came across while applying for my masters.

For a better view, I've provided ranking to these universities on 4 parameters namely **Mathematics, Statistics, Computer Science and Business** based on US News.

Therefore, for you to decide which is better, you would have to weight these parameters accordingly. For example, if you think that you are good at mathematics but not computer science, choose the programs with a higher concentration on mathematics in the curriculum.

1. MS in Data Science, Columbia University

Columbia University is located in the heart of New York city. Being an Ivy League institution, there are no questions about its reputation. The MS program is being run by the Data Science Institute at Columbia. The students have access to courses from all the top programs at the institute. The general course duration is 16 months,i.e. 3 semesters of study and an internship semester.

- **Curriculum:**
  - Courses worth 30 credits are required to be completed and most of the graduate level courses are 3 credits each.
  - It consists of 6 core courses covering the essentials of computer science, probability, statistics and machine learning.
  - There is a capstone project in the last semester.
  - Remaining 3 courses can be taken as electives from across the university.
- **Practical Training:**
  - These come in the form of an internship semester and capstone project.
  - Additionally, the Columbia Data Science Societyorganizes workshops and other events where you can get ample opportunities to interact and solve problems with your peers.
  - The city of New York has a strong data science community which will offer many opportunities to apply data science knowledge.
- **Industrial Collaboration & Research Opportunities:**
  - The data science institute runs 7 research centers which run some good research projects which can help students get a working knowledge of data science
  - Since the department consists of professors from various departments including computer science, statistics, business, civil, etc. there are ample research opportunities available.
  - Industry collaborations work in terms of sponsored research projects as well career development center which organizes career fairs, tech talks, etc.

- **Rankings:**
  - Business: 10
  - Computer Science: 15
  - Statistics: 20
  - Mathematics: 9

Conclusion: The program provides a good foundation in machine learning and programming along with practical experience. Moreover Columbia is ranked in top 20 in all the domains related to data science making it a good choice. One drawback of the program could be that the curriculum is a bit inclined towards programming and more technical in nature than few other programs, which are more business oriented.

2. MS in Data Science, New York University

NYU is located in New York city and is fairly reputed. The MS program is being run by the Center for Data Science at NYU. The students have access to courses from a wide range of departments including statistics, AI, bio-statistics, business, economics, psychology etc. The course can be completed in 3 or 4 semesters, depending on the choice of students.

- **Curriculum:**
  - 12 courses worth 36 credits are required to be completed.
  - It consists of 6 core courses covering the essentials of statistics and machine learning and a capstone project in the last semester.
  - Remaining 6 courses can be taken as electives from a wide pool of domains which can be found here. This course has a unique structure offering 50% of the courses as electives which is rarely seen in courses.
- **Practical Training:**
  - These come in the form of an internship semester and a capstone project.
  - It has a similar location advantage of being in New York City as Columbia university. As said above, NYC's strong data science community offers ample opportunities of applying data science knowledge.
- **Industrial Collaboration & Research Opportunities:**
  - Since the program consists of electives from various departments including computer science, statistics, business, civil, etc. there are ample research opportunities available. You can get some idea about the research projects here.
  - The department conducts workshops, tech talks and other events in collaboration with industry professionals. Details about those events can be found on the program website.
- **Rankings:**
  - Business: 20
  - Computer Science: 29
  - Statistics: 49
  - Mathematics: 9

Conclusion: This program will provided a strong foundation in machine learning and ample experience in a particular domain through the 6 electives courses. NYU might lack slightly in terms of the departmental rankings but the program structure and location of NYC will definitely

3. MS in Computational Data Science, Carnegie Mellon University

Carnegie Mellon University (CMU) is one of the topmost universities for research in computer science. It's CS department also run few specialized masters programs.

These programs focus on one core domain, have higher tuition fee and offers no assistance. They treat them as cash cow programs but students benefit from the high quality pedagogy. MSCDS is one such program. It spans over 16 months with 3 semesters of study and an internship semester.

- **Curriculum:**
  - There are 2 concentration to choose from – Analytics or Systems.
  - Analytics will focus on machine learning aspect and Systems will focus on big data and computational aspects.
  - Total 8 unit-courses, 2 seminar courses and 1 capstone project is required to complete the course.
  - Out of the 8 unit-courses, 3 are electives which can be taken from the Department of Computer Science.
- **Practical Training:**
  - These come in the form of an internship semester, seminar courses and capstone project.
  - The location of Pittsburg is a definite disadvantage but the brand name of CMU is too big for it to have an impact on the internship or job search. Obviously, relocation could be a potential challenge.
- **Industrial Collaboration & Research Opportunities:**
  - This is a coursework oriented program and the research/industrial collaboration opportunities come from sponsored capstone projects.
  - The institute also helps in acquiring internships and job opportunities.
- **Rankings:**
  - Business: 18
  - Computer Science: 1
  - Statistics: 9
  - Mathematics: 34

Conclusion: This is a CS oriented program and ideal for people with some coding experience who want to get into machine learning. The drawback being that the business side of the program is weak and you should not expect getting some domain experience like finance/healthcare. It is better suited for software engineering roles rather than data scientist roles.

4. MS in Machine Learning, Carnegie Mellon University

This is another program like #3 offered by the Machine Learning Department in the dept of CS at CMU. The core idea is the same except for a couple of changes:

- It is solely based on ML and is more mathematical nature. Covers theoretical ML at a broader level.
- There are only 2 elective courses and 1 final project. No seminar courses like above.
- The tuition fee is slightly less.

This would also prepare you for software engineering or research roles. You should choose this if you have a theoretical bent of mind and would like to pursue a doctorate (Ph.D) after masters.

5. MS in Analytics, Northwestern University

This interdisciplinary masters program is being run by McCormick (engineering), Kellogg (management) and Medill (journalism) schools at NWU along with industry professionals in the Chicago area. It's a 15 month program with a 10 week internship.

- **Curriculum:**
  - The curriculum consists of 14 courses, 18-month industry practicum and 1 capstone project.
  - Only 2 courses out of the 14 are electives and that too from a small pool. So, the curriculum is more or less fixed. One of the reasons for a stringent curriculum is small batch size of just 35. This is a big advantage in terms of interactions and learning during the program.
  - The courses touches upon crucial aspects of analytics including statistics, programming, databases, optimization with a focus on industry applications.
- **Practical Training:**
  - The course is heavy on practical training which start with an 8-month industry project running across the first 3 quarters. This project is organized in collaboration with an industry partner.
  - There is an internship in the summer and a capstone project in the final quarter.
  - The location of Chicago is a definite disadvantage in terms of the local opportunities, but NWU strives hard to get industrial connections to cover up this disadvantage.
- **Industrial Collaboration & Research Opportunities:**
  - The coursework is rich in industrial exposure as a plethora of activities like workshops, tech talks are conducted.
  - Both practicum and capstone projects are industry sponsored.
  - The program has no inclination towards research and you should not go there expecting any.
  - The institute also helps in acquiring internships and job opportunities.
- **Rankings:**
  - Business: 5
  - Computer Science: 34
  - Statistics: 49
  - Mathematics: 17

Conclusion: This program is designed for people working in a particular domain who want to understand analytics and its applications in different industries. It is not designed for techies who want to incorporate machine learning algorithms in their software. The program makes heavy use of the industry connections coming from Kellogg School of Management, which is one of the most reputed management institution of the world.

6. MS in Analytics, Georgia Institute of Technology

This interdisciplinary program is run jointly by the College of Engineering, Business and Computing at GaTech. Its a 1 year program and covers the fall, spring and summer semesters.

- **Curriculum:**
  - The program is designed in the form of 3 tracks – Analytics Tools, Business Analytics and Computational Data Analytics. The details can be found here.

    - Each track covers statistics, operational research and computing courses. The number of courses of each type differ by track.
    - There is a fair share of electives which depend on the chosen track. In general, there are 5 core courses and 5 electives.
- **Practical Training:**
    - The program is typically a coursework based culminating into 2 capstone projects in the summer semester or an internship, if approved by the faculty.
    - The location of Georgia is a definite disadvantage in terms of the local opportunities, but there are still some meetup groups and online hackathon events which you can attend.
- **Industrial Collaboration & Research Opportunities:**
    - The capstone projects undertaken are in collaboration with the industry.
    - Some guest lectures and tech talks are also organized.
    - The program has no inclination towards research and you should not go there expecting any.
    - The institute also helps in acquiring internships and job opportunities.
- **Rankings:**
    - Business: 34
    - Computer Science: 9
    - Industrial and Systems Engineering: 1
    - Mathematics: 29

Conclusion: This is a typical coursework based program. One drawback could be the choice between a capstone and internship. Also, the short duration of the program will put additional academic burden and restricts the networking opportunities. The positives are in terms of GaTech's brand name and the involvement of operations research courses in which GaTech is one of the best institutes.

7. MS in Analytics, North Carolina State University

This program is managed by the Institute of Advanced Analytics at NCSU and is the first analytics program started way back in 2007.

Most of the other programs are 2-4 years old and thus lack recognition. But NCSU is a highly reputed program in the analytics industry, even though NCSU as a whole is considered a tier 2 institution. This is a 10-month intensive program, with 3 semesters starting in the summer and ending in spring. Moreover, GRE score is not required for application, only TOEFL is required.

- **Curriculum:**
    - The curriculum exposes students to a wide spectrum of topics which can be found here.
    - The program ends with an industry sponsored capstone project.
    - The curriculum focuses on mathematics and statistics and covers many statistical techniques.
- **Practical Training:**
    - The program is a typical coursework based with 2 practical courses. There is no option of an internship.
    - The location of North Carolina is not rick in local opportunities in data science, but the course is intensive enough to keep students exhausted during the 10 months.
- **Industrial Collaboration & Research Opportunities**
    - The capstone projects are in collaboration with the industry.
    - Some guest lectures and tech talks are also organized.
    - The program has no inclination towards research and you should not go there expecting any.
    - The institute also helps in acquiring internships and job opportunities.

- **Rankings:**
  - Business: 52
  - Computer Science: 48
  - Statistics: 15
  - Mathematics: 52

Conclusion: NCSU is a well reputed program with good future prospects. It prepare candidates well for data scientist roles as it exposes them to a wide spectrum of analytics techniques. Strong mathematics and statistics fundamentals are required to get into this program and you should apply only if you are confident about the same.

8. MS in Analytics, Texas A&M University

The masters program at TAMU is offered by the department of statistics and it's a part-time program for working professionals. The program website is not much informative but TAMU as an institution has a decent reputation in the industry. Being a part time program, it is spread over 5 semesters.

- **Curriculum:**
  - The curriculum consists of 12 courses, details of which can be found here.
  - The program ends with an industry sponsored capstone project.
  - There are only 2 elective courses.
  - The curriculum has a focus on statistics with applications in finance and marketing.
- **Practical Training:**
  - The program is typically coursework based with a capstone project and a seminar with oral presentation.
  - There is focus on SAS programming which prepares you well for the industry.
- **Industrial Collaboration & Research Opportunities**
  - Being a part time program, there is no focus on research.
  - The program's advisory body is made up of industry professionals so the program runs hand-in-hand with the requirements in the industry.
  - TAMU organizes some other events as well like the Analytics 2015 conference.
- **Rankings:**
  - Business: 31
  - Computer Science: 40
  - Statistics: 15
  - Mathematics: 41

Overall, it is a decent program and designed specifically for working professionals.

9. MS in Business Analytics, Michigan State University

This is a 1 year program which commences in the spring semester and continues in summer and fall with graduation in December. The course prepares students for data scientist roles in industries such as consulting, automotive, consumer products, retail, and financial services.

- **Curriculum:**
  - The curriculum consists of 12 courses, details of which can be found here.
  - There are only no elective courses as all courses are pre-defined.
  - The summer semester has workload of only 2 courses and in addition a capstone project of a 10-12 week internship can be completed in that period.
- **Practical Training:**
  - The program is typically coursework based with an option of capstone project or an internship.
- **Industrial Collaboration & Research Opportunities**
  - It's a typical coursework based program with no attention on research.
  - The capstone projects are conducted in collaboration with an industry partner.
  - University organizes internship and job fairs as well.
- **Rankings:**
  - Business: 35
  - Computer Science: 56
  - Statistics: 47
  - Mathematics: 46

Conclusion: This is a good program and if you like the fixed curriculum, it might work out. Also, since Michigan State University is not as reputed as some other universities mentioned here, it might be easier to get in.

10. MS in Business Analytics, University of Cincinnati

This is another 1 year program commencing in fall, with a more or less fixed curriculum. It prepares the candidates for business analyst and data scientist positions.

- **Curriculum:**
  - The curriculum consists of 12 courses, details of which can be found here.
  - The program ends with an industry sponsored capstone project.
  - There are only 2 elective courses.
- **Practical Training:**
  - The program is typically coursework based with a capstone project.
  - The location of Cincinnati also doesn't offer a vibrant data science community to take advantage from.
- **Industrial Collaboration & Research Opportunities**
  - The program has no focus on research.
  - List most other courses, industry collaborations are in the form of job fairs, tech talks and sponsored capstone.
- **Rankings:**
  - Business: 63
  - Computer Science: 112
  - Statistics: –
  - Mathematics: 115

Conclusion: This is a slightly less reputed university with a decent program which should be comparatively easier to get through. But you should be comfortable with the curriculum before you think about taking it up.

Summary Table

S.No.	Name of Program	Business	Computer Science	Statistics	Industrial and Systems Engineering	Mathematics
1.	MS in Data Science, Columbia University	10	15	20	-	9
2.	MS in Data Science, New York University	20	29	49	-	9
3.	MS in Computational Data Science, Carnegie Mellon University	18	1	9	-	34
4.	MS in Machine Learning, Carnegie Mellon University	-	-	-	-	-
5.	MS in Analytics, Northwestern University	5	34	49	-	17
6.	MS in Analytics, Georgia Institute of Technology	34	9	-	1	29
7.	MS in Analytics, North Carolina State University	52	48	15	-	52
8.	MS in Analytics, Texas A&M University	31	40	15		41
9.	MS in Business Analytics, Michigan State University	35	56	47	-	46
10.	MS in Business Analytics, University of Cincinnati	63	112	-	-	115

Some More Programs

I'm adding a list of other programs which you can consider and evaluate using the ideas shared above. Please feel free to drop a comment if you feel other programs should be added and I'll be happy to make a mention here.

- MS in Data Science, University of Washington
- Master of Business Analytics, MIT Sloan
- Master of Information and Data Science (MIDS), UC Berkeley [online program]
- MS in Data Informatics, University of Southern California
- MS in Analytics, University of Chicago
- MS in Data Science, Southern Methodist University
- MS in Business Analytics, Arizona State University
- MS in Data Science, Illinois Institute of Technology
- MS in Analtics, University of San Francisco

MS in other departments with Data Science/Machine Learning specialization:

- MS in CS, Columbia University
- MS in CS, University of Southern California
- MS in Statistics, Stanford

Other related programs:

- MS in Operations Research and Information Engineering, Cornell University
- MS in Management Science and Engineering, Stanford University
- MS in Operations Research, Columbia University

List of online data science programs – click here.

List of online business analytics programs – click here.

End Notes

In this article, I've discussed the various factors which you should consider while selecting a masters program in data science in USA. I have also evaluated 10 programs on some of these factors based on available information.

This should be sufficient for making an initial selection of which courses to apply to. But while making the final selection of which institution to attend, you should consider additional factors which might require your extra effort and research.

Please note that these days there are many traditional courses which offer a specialization in data science like an MS in Computer Science with machine learning track or an MS in Statistics with data science track. I haven't considered such courses here because they have a focus on the core subject with subtle emphasis on data science. If you have a core domain, you can check out such courses as well.

I would like to restate that this is by no means a ranking of the institutions. Actually, rankings will be very relative because each program has some pros and cons making the suitability vary from one individual