# MS Business Analytics – Accounting Track (MSAA)
## 2019-2020 Academic Year

## List of Courses by Semester

### Preprogram Foundation Requirements

Preparatory work begins in July/August, is in addition to required credits and does not affect GPA.

**Required:**
- MKT 500V Basics of R Programming (0.5)
- ACCT 560 - Introduction to Financial Accounting (2.0)

Choose at least one of:
- MKT 500R Basics of Statistics Using SPSS (0.5)
- MGT 574 Basics of Stata programming (0.5)
- MGT 573 Basics of SAS programming (0.5)

### Fall Semester (12 core + 3 Track Required = 15 credits)

<table>
<thead>
<tr>
<th>Fall A</th>
<th>Fall B</th>
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<tbody>
<tr>
<td><strong>Required:</strong></td>
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<tr>
<td>DAT 560G Database Design and SQL (1.5)</td>
<td>DAT 560M: Big Data and Cloud Computing (1.5)</td>
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<tr>
<td>MGT 560F: Managerial Communications (1.5)</td>
<td>DAT 500N: Prescriptive Analytics (1.5)</td>
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<td><strong>Required:</strong></td>
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<tr>
<td>DAT 500S: Predictive Analytics for Business Decision-Making (3)</td>
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<td>DAT 561: Intro to Python and Data Science (3)</td>
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<tr>
<td><strong>Track Required:</strong></td>
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<tr>
<td>ACCT 562: Financial Accounting II (3.0) – Intermediate Accounting</td>
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### Spring Semester (6 core + 3 track + 3 electives (see page 2) = 12 credits)

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<tr>
<th>Spring A</th>
<th>Spring B</th>
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<tr>
<td><strong>Track Required:</strong></td>
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<tr>
<td>ACCT 500M: Ethical Decision Making in Accounting 1 (1.5)</td>
<td>MGT 561 Text Mining (1.5)</td>
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<tr>
<td>ACCT 5002: Strategic Cost Analysis (1.5)</td>
<td>MGT 560N Introduction to Cybersecurity (1.5)</td>
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<td><strong>Required:</strong></td>
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<td>MKT 500W Causal Inference (3)</td>
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### Final Fall Semester (7.5 track + 4.5 electives (see page 2) = 12 credits)

<table>
<thead>
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<th>Fall A</th>
<th>Fall B</th>
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<tr>
<td><strong>Track Requirements:</strong></td>
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<tr>
<td>ACCT 503: Business Analysis Using Financial Statements (1.5)</td>
<td>ACCT 503B: Advanced Business Analysis Using Financial Statements (1.5)</td>
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<tr>
<td>ACCT 5xx: Financial Reporting &amp; Assurance in a BlockChain World (1.5)</td>
<td>ACCT Elective (1.5)</td>
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<td><strong>Track Required:</strong></td>
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<tr>
<td>ACCT 555: Accounting Policy and Research (3.0)</td>
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## Total 39 credits: 18 common core, 13.5 track required, 7.5 electives
Core Analytics Courses
A total of 18 credits are common to all tracks and build your analytics knowledge base.

The first fall semester introduces key concepts and tools including Database Design and SQL and Big Data and Cloud Computing, as well as:

- **Intro to Python and Data Science** introduces programming language to acquire, clean, analyze, and visualize data (descriptive analytics) for reporting and complex optimization.
- **Predictive Analytics** covers advanced analytic techniques such as neural networks and stochastic gradient boosting to convert raw and messy business data into robust predictions of future customer behavior or critical organizational elements.
- **Prescriptive Analytics** builds upon the descriptive and predictive analytics course work through the use of optimization models and software tools to suggest decision options for a wide variety of business decisions (course is called Optimization for Business in the MSAA track).

In addition, Managerial Communication introduces students to fundamental best practices in business writing and business speaking.

Core requirements conclude in the spring semester with an Introduction to Cybersecurity and two advanced analytic topics:

- **Causal Inference** teaches statistical and experimental methods to identify casual relations among data sets and reject prescriptive options based on biased samples or reverse causality.
- **Text Mining** provides techniques, algorithms, and tools for collecting, organizing, summarizing, and analyzing textual data for topic and sentiment analysis and predictive modeling.

**Electives for MS Business Analytics in Accounting:**
ACCT 500E Information Technology Control & Audit (1.5)
ACCT 500D Fraud Prevention and Internal Controls (1.5)
ACCT 500N Ethical Decision Making in Accounting 2 (1.5)
ACCT 502 Managerial Control Systems (1.5)
ACCT 505 Advances in Management Accounting (1.5)
ACCT 507 Financial Issues in Leasing (1.5)
ACCT 509 Tax and Business Strategy: A Planning Approach (1.5)
ACCT 563 Financial Reporting III (Advanced Accounting) (3.0)
ACCT 564 Auditing (3.0)
ACCT 567 Income Tax (3.0)

*All letter graded courses, count towards degree and GPA calculation. Math and some CSE courses can be taken Pass/Fail and count towards degree.*

**Note:** Only 12 hours of approved CSE courses may count toward degree requirements.

**Note to International students:** Additional English courses may be required or waived upon arrival. If taken, these courses are over and above required credits, are graded on a pass/fail basis, and do not count towards a student’s GPA calculation.

Students may take up to 19.5 credits of business coursework in the fall and spring semesters under the flat tuition rate.

The degree requirements and policies in this document apply to MSAA students entering Washington University during the 2019-20 academic year. Every effort is made to ensure that the information is accurate and correct as of the date of publication (10/29/18). Washington University reserves the right to make changes at any time without prior notice. Therefore, this curriculum document may change from time to time without notice. The governing document at any given time is the then-current version, as published online.
MSA - Accounting Analytics Course Descriptions

**Summer Foundations Courses – Required**

**MKT 500V Basics of R Programming**

R has become the tool of choice for many data science and customer analytics professionals in every industry and field. It is not surprising to see a requirement for being familiar with R in job descriptions. R is very flexible in carry out data analysis. Part of the benefit of being open source is that many programmers/researchers are constantly introducing new statistical analysis tools into R through R packages. Given all the benefits, R does have a relatively steeper learning curve. To better prepare MSA students, we introduce this 2 day introduction to R programming course. This class will help you master the basics of R. We will start from the very beginning - installation of the program. No prior knowledge in programming is required. Through in class demonstration and lots of hands-on practice, by the end of the second day, you will have the chance to undertake your own data analysis and solve relevant business problems using R. 0.5 Credits. Graded Pass/Fail.

**ACCT 560 Introduction to Financial Accounting**

In this course we will study the three fundamental financial accounting issues, including (1) recognition, (2) measurement/valuation, and (3) classification/disclosure and consider how business transactions are reflected on the financial statements using generally accepted accounting principles (GAAP). We will cover the four primary financial statements (balance sheet, income statement, statement of stockholders’ equity, and statement of cash flows), the supporting footnotes to these statements, and several reports (annual reports, proxy statements, and press releases). The course incorporates both a preparer's perspective (i.e., GAAP requirements for recording and presenting financial information) and a user's perspective (i.e., how an investor or analyst can interpret and use financial statement information). Course Goal: Prepare students for advanced coursework in accounting and finance classes, beginning in the Fall A term.

**Summer Foundations Courses – Choose at least one of the following:**

**MKT 500R Basics of Statistics Using SPSS**

This foundational course, which is a required course for students in the MSA program, will cover material that serves as useful preparation for courses offered in the Olin curriculum that rely extensively on applied statistical concepts (e.g., marketing research, advanced marketing research, database marketing, data analysis for brand management etc.). The course will provide students with both an overview of basic statistical concepts and a practical grasp of statistical analysis. Students will be trained to use SPSS, a popular statistical software package, in order to perform the statistical analysis. The course will also cover interpretation of results. 0.5 Credits. Graded Pass/Fail.

**MGT 573 Basics of SAS Programming**

Statistics using SAS serves as a technical basis for research and data analysis. This course will provide students with an overview of statistical knowledge and with a good practice of analysis techniques. Students will be trained to use SAS, one of the most commonly used tools in commercial analytics markets, to analyze data and interpret results. The course aims to prepare students for more advanced courses in data analytics. Graded pass/fail.
**MGT 574  Basics of Stata Programming**

As one of the most popular statistics software packages, Stata has served as an essential tool of data science in every industry and academia. The goals of the course are to better prepare students for success in future courses and careers. Students will be trained to obtain necessary technical skills of using Stata by the end of this two-day course. The introduction of Stata will be from the very beginning, and therefore there is no prerequisite required. Basic statistics foundations will be reviewed to facilitate the goals of the course. Graded pass/fail.

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**Required Core Courses**

**DAT 560G  Database Design and SQL**

Databases are at the foundation of every organization's information strategy. Understanding the structure of databases and mastering the tools to analyze data are essential skills in any role. The tools developed in this course assist students in implementing a company's data management strategy and developing well-grounded analytical recommendations. In this course we focus on understanding how data is structured in relational databases. With vast amounts of data available, from disparate sources, effective organization of the data is essential to its utilization. To complement this, we utilize SQL (Structured Query Language) as the primary tool to extract data for managerial reports and for advanced analytical models. Practical experience with current relational database software is developed throughout the course. This course is required for MS/CA students and priority will be given to SMP students. 1.5 Credits.

**OMM 500N  Prescriptive Analytics**

This course covers optimization models and tools as they apply to the design and analysis of supply chains. Production planning, distribution, network design, and revenue management problems are covered using the methods of linear, non-linear, and integer programming. Upon successful completion of this course, students will demonstrate competency in formulating and solving supply chain optimization models of real-life complexity using state-of-the-art software. They will become proficient with industrial strength software tools like AMPL and Gurobi alongside Excel's Solver. The course emphasizes proficiency in model-building and using software tools rather than theory. 1.5 Credits.

**MGT 560F  Professional Business Communication**

Communication is the process of sending and receiving messages, however, communication is effective only when the message is understood and when it stimulates action or encourages the receiver to think in a new way. This course will introduce students to fundamental best practices in business writing and business speaking that will ensure effective communication. Students will participate in activities that will develop professional business communication skills in both writing and speaking. These will include: preparing, writing and delivering presentations, composing clear concise business messages in a variety of formats, understanding emotional intelligence to reach the audience and utilizing critical thinking as a basis for communication strategies. 1.5 Credits.
**DAT 500S  Predictive Analytics for Business Decision-Making**

Predictive Analytics deals with the employment of formal learning from business experience, using business data, to predict the future behavior of customers or other critical organizational elements in order to drive better business decisions. This course emphasizes data situations that students are likely to face in marketing, finance, manufacturing and consulting jobs. Students will analyze real-world business datasets using various advanced analytic techniques such as logistic regression, decision trees, neural networks, stochastic gradient boosting, MARSplines, Ensembles, Clustering, Associations etc. The focus of the course lies in the conversion of raw and messy business data into robust actionable predictions for decision-making. 3 credits.

**DAT 561  Introduction to Python and Data Science**

This is a 3-credit course offered to MSBA students. It provides students the necessary skill set to extract reliable insights from large datasets prevalent in various business applications, such as supply chain management, marketplace operations, healthcare analytics and financial engineering, using Python. In this course, students will develop basic tools to understand Python programs and implement data processing pipelines using Python. In particular, students will learn how to acquire, clean, analyze and visualize data in Python, which they will then use to improve decision-making processes. Throughout the course, students will use the Python programming language, which is very effective for data manipulation, reporting, and complex optimization. Topics covered include introduction to Python programming, data acquisition and cleaning, data manipulation, current multi-source data collection technology used in practice, basic data visualization using Matplotlib, ggplot2 and Bokeh. 3 Credits.

**DAT 560M  Big Data & Cloud Computing**

The growth in available data is a challenge to many companies. This presents an opportunity for companies to conquer the vast and various data available to them. The growth in data includes traditional structured data, as well as unstructured data created by both people and machines. It is essential for analysts to be comfortable in the new technologies and tools that are being developed to store, retrieve, analyze, and report, using the vast data resources available. This course introduces students to the technologies currently deployed to overcome the challenges of Big Data. Prerequisite: MGT 560G.

**MGT 561  Text Mining**

Consumers and companies constantly generate large amounts of unstructured or lightly structured texts on the web and offline: exchanges of consumer opinions on products and services on social media, transcripts of phone conversations with customer representatives, open-ended surveys, etc. By employing text analytics, businesses can derive at scale valuable insights into consumer attitudes to brands, competitive landscape, and customer relationships, among other applications. This course introduces students to the methods of mining, organizing, summarizing, and analyzing textual data with the objective of driving business decision-making.

In particular, the course will cover the following substantive topics:
- Sources of business-relevant text data and web crawling;
- Topic analysis;
- Sentiment analysis;
- Use of text in predictive modeling (churn analysis, predicting CTR with search terms);
The focus of the course is on understanding and hands-on implementation of relevant algorithms and techniques, but the course will provide the opportunity to use a number of (open-source) software tools.

**MGT 560N Introduction to Cybersecurity**

This course covers a broad range of cyber security terms, definitions, perspectives, concepts, and current trends with a focus on managing risk and the use of information and cyber security as business enablers. Students will complete a cybersecurity analytics-related project as part of the coursework.

**MKT 500W Causal Inference**

This course introduces students to causal inference. The advance in information technology has given an enormous amount of valuable data to businesses. Data analysts and data scientists have become the cool kids due to high demand in data talents. In the meantime, however, artificial intelligence is getting better at finding correlational patterns in data. This means that AI may even replace some tasks performed by data scientists in the coming years.

The good news is that good data-driven decision making often goes beyond discovering correlations in the data. In particular, making the right prescriptive decisions often requires managers to tease out the causal relationship(s) between the prescriptions and outcomes of interest. Artificial intelligence has yet to show such abilities. Therefore, mastering causal inference is likely to become more rewarding over time as AI continues to complement human judgement with quick data analyses at a low cost.

Throughout the course, we will go over many examples of why understanding causal relationships is important. Spoiler alert: in one example, Lewis, Rao, and Reiley (2012) find that a naïve estimation could show that advertisement leads to an 870%--1,200% increase in consumers’ likelihood of search for the advertised brand, while the true causal effect is 0. Imagine how disastrous it would be if companies make advertising decisions based on false causal inferences!

Our goals in the course are
- Use proper statistical tools to tease out the deterministic process that have generated the data in the presence of randomness.
- Become skeptical about claims of causality. You should be able to give alternative data generating processes that could have generated the same data.
- Understand that observational data come from agents’ decisions, and that these decisions could lead to biased samples.
- Understand omitted variable bias and reverse causality.
- Design and implement various statistical and experimental methods of addressing the basic causal-inference problem using statistical software.
- Dig deeper into the mechanisms (decision trees) that yield the causal relations.
- Articulate analyses in presentations.

3 Credits
Required Track Courses

**ACCT 562 Financial Accounting II**
Provides a more in-depth analysis of financial accounting and reporting issues than ACC 5600. Primary subject matter involves the issues of asset and liability valuation and income measurement. Topics include inventory accounting, valuation of long-term liabilities, and revenue and expense recognition. Also introduces the regulation of corporate accounting and reporting practices and their effects on users of financial statements.

**ACCT 500M Ethical Decision Making in Accounting I**
This course has been designed to help the student understand ethical reasoning and behavior and in so doing define their own moral compass. The primary goal being to make the student a role model to others in ethical behavior - not just in determining what is the proper ethical choice, but, more importantly, effectively implementing the behavioral changes required to achieve solutions to ethical dilemmas. To quote while paraphrasing the authors of the textbook, "We strive in (these courses) not only to educate accounting students to be future leaders in the accounting profession but to stimulate (the students) ethical perception and cultivate virtue thereby awakening (their) sense of duty and obligation to the public interest."

**ACCT 5002 Strategic Cost Analysis**
This course provides an introduction to cost concepts, cost behavior and cost systems. Understand how strategy, technology and the environment affect a firm's choice of cost system type and system design alternatives. Discuss how cost system choices, in turn, influence tactical and strategic managerial decision-making. Tools such as cost-volume-profitability analysis, customer profitability, value chain analysis and relevant-cost analysis are presented. Case discussions illustrate the application of course topics.

**ACCT 503 Business Analysis Using Financial Statements**
In this course we use concepts from financial accounting, finance, and strategy to develop models used by financial analysts in valuing equity securities (although we will focus on equity valuation, our approach is applicable to issues faced by managers considering investment opportunities). We will discuss/review a variety of models, including the dividend model, the free cash flow model, the method of comparables/multiples, and the asset-based valuation model. These more traditional models will be contrasted with the residual income valuation model, a relatively recent valuation innovation.

**ACCT 503B Advanced Business Analysis Using Financial Statements**
This course builds on ACCT 503. We investigate approaches to forecasting future value drivers of firms and then the preparation of pro forma financial statements based on these forecasts. The concepts will be applied by having students prepare an equity analyst report. The report is the communications of evidence collected from a systematic study of a firm, its environment, and its future prospects to justify a recommendation.
ACCT 5xx Financial Reporting & Assurance in a BlockChain World

ACCT 555 Accounting Policy and Research

This course is designed for Students in the Masters in Accounting Program (MACC) and integrates material from previous accounting courses and professional experiences. This course will enable students to develop their knowledge and appreciation of current debates that surround the accounting profession. Students will develop critical thinking skills regarding these issues and form and defend opinions about contemporary regulatory and market issues. The course will also provide an opportunity for students to learn important technical and research tools used by accounting practitioners. Finally, students will get an appreciation of the primary methods underlying academic research in accounting. Prerequisites: ACCT 562 or permission of the instructor. Students must be enrolled in the MACC program or have prior approval for the instructor.

Electives

ACCT 500E Info Technology Control & Audit:

This course is designed to provide students with an introduction and overview of the field of Information Technology (IT) Auditing. It is intended to provide students with an understanding of risks in the IT environment, general computer and application control concepts and the basics of how to perform an IT audit. The course will also introduce students to the ISACA COBIT framework and the concepts of IT governance and assurance. Prerequisite: Note: students must either have completed ACCT 564 previously or be concurrently enrolled. 1.5 Credits.

ACCT 500D Fraud Prevention

This course is designed to provide students with an overview of various forms of fraud, the role of auditors and forensic accountants in detecting the fraud, and how internal controls may be designed to prevent such activity. The course will draw extensively on cases that illustrate the various types of fraud. In each topical area, students will examine the techniques that may enable an investigator to detect the fraudulent practices and also develop appropriate internal controls that would help a corporation minimize or prevent the fraudulent practices. 1.5 Credits.

ACCT 500N Ethical Decision Making in Accounting II

This course builds on Ethical Decision Making in Accounting I; thereby, developing a deeper understanding of ethical behavior including dealing with fraud in financial statements, legal obligations of auditors, Wall Street expectations and earnings management and what it takes to be an ethical leader. To quote the author of the course text, "...it comes down to one’s sense of right and wrong and willingness to voice values to positively impact (the) auditor responsibility...". This second segment of Ethical Decision Making in Accounting is offered for the purpose of creating ethical leaders in the accounting and auditing profession, the business community and society and instilling that sense of right and wrong and the eagerness to put it into action.
ACCT 502 Managerial Control Systems

Organizations face both information and incentive problems, usually simultaneously. Managerial control involves developing policies and systems to cost-effectively minimize these problems while helping the organization achieve its objectives. The course focuses on control issues by analyzing the financial aspects of planning, feedback, and performance measurement. Topics include: responsibility accounting, budgeting, benchmarking, target costing, variance analysis, productivity measures, transfer pricing and optimal design of performance measures.

ACCT 505 Advances in Management Accounting

This course focuses on current management accounting techniques, including activity-based costing, target and kaizen costing, international management accounting, and management accounting in Internet companies. Investigating these topics will include use of ABC software to illustrate the process of implementing an ABC information system. Also new in this course will be project focused on comparing and contrasting management accounting techniques of traditional and Internet companies. Prerequisite: ACCT 5002

ACCT 507 Financial Issues in Leasing

This course is devoted to studying the various elements that are involved in identifying leasing opportunities and structuring a lease. Topics to be covered include the legal and financial structure of a lease, options embedded in lease agreements, accounting and tax issues related to leases, and the marketing and negotiation of leases.

ACCT 509 Tax & Business Strategy

This course is intended to provide business students with an overall framework for taking tax considerations into account when making business decisions. More specifically, as the textbook authors point out in the preface to the book, the course is intended to provide students with “a solid understanding of the decision contexts that give rise to tax planning opportunities, how to integrate tax strategy into the bigger picture of corporate decision making, and the dramatic impact that changes the transaction structure can have on after-tax cash flows.” This course is not intended to provide students with the understanding of the technical tax rules that will be discussed during the course. However, many technical tax rules will be mentioned throughout the course and a general framework of the tax rules will be provided so as to facilitate a discussion of how these tax rules affect business decision-making. Prerequisite: ACCT 567 or permission of the instructor. 1.5 Credits.

ACCT 563 Financial Reporting III (Advanced Accounting)

Accounting issues related to three major topical areas are covered. The first half of the course is dedicated to intercorporate investment activity and related reporting issues, including business combinations, preparation of consolidated financial statements, variable interest entities and other complex structures and transactions. Transactions and investments involving foreign currencies and foreign subsidiaries, and the extensive financial reporting issues related to derivatives round out the second half of the course. Numerous recent additions to the professional literature are integrated into the course. Prerequisite: ACCT 562 or permission of instructor.
ACCT 564 Auditing

This course deals with the professional service industry of auditing. The auditing industry provides the service of objectively obtaining, evaluating, and communicating evidence regarding managerial assertions about economic events. Specifically, auditing ascertains the degree of correspondence between managerial assertions and established criteria. The course is organized around the basic categories of: (1) the economic role of external corporate auditing in securities markets, (2) the composition of the firms in the auditing industry, (3) the regulatory environment of auditing, (4) litigation issues facing the accounting/auditing industry, and (5) the requirements for conducting audits. Topics included in the last area include a consideration of the scope and application of Generally Accepted Auditing Standards (GAAS) and the general technology of auditing which are some general auditing topics typically covered on the CPA exam. Grading is based on homework, a group-based project, and two exams. Required Course for MACC Students.

ACCT 567 Federal Income Tax

This course provides an introduction to federal income taxation with primary emphasis on the tax implications of business transactions. The objectives of the course are to develop a basic understanding of federal income tax laws and to provide a framework for integrating income tax planning into the decision-making process. The course is of value to all students who need to recognize the important tax consequences of many common business transactions and is not intended solely for accounting majors or those students interested in becoming tax specialists.