

### Master of Science in Business Analytics (MSA) Accounting & Auditing Analytics Track 2020–2021 Academic Year

**39 credits as follows:**  
**18 common core credits**  
**13.5 track required credits – as indicated by \*\***  
**7.5 elective credits**

September 2020 (subject to change)

<b>MSA – Accounting &amp; Auditing Analytics Three-Semester Course Plan</b>	
<p><b>Preprogram Foundations Requirements</b>                      Preparatory work begins in July/August, is in addition to required credits, and does not affect GPA.                      MKT 500V Basics of R Programming (0.5)                      ACCT 560 Introduction to Financial Accounting</p>	
<b>Fall Semester (12 core + 3 track required = 15 credits)</b>	
<b>Fall A</b>	<b>Fall B</b>
<p><u>Required:</u>                      DAT 560G Database Design &amp; SQL (1.5)</p>	<p><u>Required:</u>                      DAT 500N Prescriptive Analytics (1.5)                      DAT 560M Big Data &amp; Cloud Computing (1.5)</p>
<p><u>Required:</u>                      MGT 560F Professional Business Communication (1.5)                      DAT 500S Machine Learning Tools for Prediction of Business Outcomes (3)                      DAT 561 Introduction to Python and Data Science (3)</p> <p><u>Track Required:</u>                      ACCT 562 Financial Accounting II (Intermediate Accounting) (3)**</p>	
<b>Spring Semester (6 core + 3-6 track required = 9-12 credits + electives)</b>	
<b>Spring A</b>	<b>Spring B</b>
<p><u>Track Required:</u>                      ACCT 5002 Strategic Cost Analysis (1.5)**</p>	<p><u>Required:</u>                      DAT 560E Data Visualization for Business Insights (1.5)                      DAT 562 Text Mining (1.5)</p> <p><u>Track Required:</u>                      ACCT 500M Ethical Decision Making in Accounting I (1.5)**</p>
<p><u>Required:</u>                      DAT 500W A/B Testing for Business and Social Science (3)</p> <p><u>Track Required:</u>                      ACCT 555 Accounting Policy and Research (3)** <i>(also offered in fall semester)</i></p> <p>Required experiential course: MGT 551 Summer CPT course (1.5), MGT 501P CEL Practicum (3), or MGT 501T Taylor Comm Consulting Proj (3)</p>	
<p><u>Electives (choose 3 or more credits from the following or other analytics courses proposed by the other tracks):</u></p>	
<p>ACCT 502 Managerial Control Systems (1.5)                      ACCT 507 Financial Issues in Leasing (1.5)</p>	<p>ACCT 500D Fraud Prevention and Internal Controls (1.5)                      ACCT 505 Advances in Management Accounting (1.5)                      ACCT 509 Tax and Business Strategy: A Planning Approach (1.5)                      DAT 560N Introduction to Cybersecurity (1.5)</p>
<p>ACCT 563 Financial Accounting III (Advanced Accounting) (3)                      ACCT 564 Auditing (3)</p>	

**Second Fall Semester (4.5-7.5 track required + electives)**

<b>Fall A</b>		<b>Fall B</b>	
<u>Track Required:</u> ACCT 503 Business Analysis Using Financial Statements (1.5)		<u>Track Required:</u> ACCT 503B Adv. Business Analysis Using Financial Statements (1.5) ACCT 510E Fin. Reporting & Assurance in a Blockchain World (1.5)	
<u>Track Required:</u> ACCT 555 Accounting Policy and Research (3)** <i>(also offered in spring semester)</i> Required experiential course: MGT 551 Summer CPT course (1.5), MGT 501P CEL Practicum (3), or MGT 501T Taylor Comm Consulting Proj (3)			
<u>Electives (choose 4.5 or more credits from the following or other analytics courses proposed by the other tracks):</u>			
		ACCT 500E Information Technology Control & Audit (1.5) ACCT 500N Ethical Decision Making in Accounting II (1.5) DAT 565E Deep Learning for Business Analytics (1.5)	
ACCT 564 Auditing (3) ACCT 567 Income Tax Fundamentals (3)			
<b>Total: 39 credits (18 common core credits, 13.5 track required credits, 7.5 elective credits)</b>			

Under the flat tuition rate, students may take up to 18 credits per semester. Additional courses are charged per-credit.

The degree requirements and policies in this document apply to students entering Washington University during the 2020–2021 academic year. Every effort is made to ensure that the information is accurate and correct as of the date of publication (9/9/20). 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 & Auditing Analytics Course Descriptions

## Summer Foundations Workshops

### 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 MSCA 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 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).

## Required Core Courses

### DAT 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

### DAT 500S Machine Learning Tools for Prediction of Business Outcomes

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 in to robust actionable predictions for decision-making. 3 credits.

### DAT 500W A/B Testing in Business and Social Science

This course introduces students to causal methods that are used to measure the impact of business and policy decisions. The key insight of the course is that correlation does not imply causation and therefore cannot measure impact. In this class, we will learn about A/B testing and other causal methods, as well as how to implement them in business, economic, and policy situations. 3 credits.

### **DAT 560E Data Visualization for Business Insights**

Data Visualization has become a core skill set to derive business insights in the data rich business world. Organizations are expecting Business Analysts and Managers to create and disseminate insightful visualizations about the business. This course teaches students the necessary skill set to create insightful visualizations using Tableau to understand patterns prevalent in large datasets which are otherwise difficult to comprehend. In particular, students will learn how to choose and create appropriate visualization based on the following three criteria: 1. Who's the audience looking at the visualization? 2. What is the nature of the business goal (Descriptive, Predictive, or Prescriptive)? 3. What is the data (Categorical, Numerical, Time Series, etc.)? The course will expose students to prevalent business applications of data visualization in different domains (Customer Analytics, Supply Chain Analytics, Healthcare Analytics, Financial Technology Analytics, Accounting Analytics, Talent Analytics etc.). Upon completing this course, students will know how to create insightful dashboards and other visualizations for different audiences from the given data according to the specified goal. 1.5 credits.

### **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.

### **DAT 560M Big Data and 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. 1.5 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 562 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. 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.

## Required Track Courses

### **ACCT 562 Financial Accounting II – Intermediate Accounting**

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. 3 credits.

### **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." 1.5 credits.

### **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. 1.5 credits.

### **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. 1.5 credits.

### **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. 1.5 credits.

### **ACCT 5XX Financial Reporting & Assurance in a Blockchain World**

1.5 credits.

### **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. 3 credits.

## Electives

### **ACCT 500E Information 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 and Internal Controls**

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. 1.5 credits.

### **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. 1.5 credits.

### **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. 1.5 credits.

### **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. 1.5 credits.

### **ACCT 509 Tax & Business Strategy: A Planning Approach**

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. 3 credits.

### **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. 3 credits.

### **ACCT 567 Income Tax Fundamentals**

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. 3 credits.

### **DAT 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. 1.5 credits.

### **DAT 565E Deep Learning for Business Analytics**

Deep Learning has become a core skillset to solve business problems in the unstructured, data-rich business world. Experts estimate approximately that 90% of the data in organizations is unstructured datasets (including images, texts, customer reviews, videos, etc.). Organizations would like to use these datasets to improve their business. Moreover, deep learning has a significant advantage over other machine learning algorithms, in that it does not require extracting "features" manually, prior to applying algorithms. Leading-edge organizations are also expecting business analysts and managers to be familiar with applying deep learning models to solve business problems using unstructured data. This course is a 1.5-credit required course offered to MS-Business Analytics (MSA) students in all tracks. The course will teach students to build deep learning models for solving business problems using python libraries (e.g., Keras, Tensorflow, etc.). We will cover a range of algorithms from neural networks foundations, to convolutional and recurrent network structures. These will be applied in domains such as marketing, customer behavior, and predicting finance risks. In the course, students will learn deep learning practically based on the following five questions: 1. How to visualize and analyze unstructured datasets? 2. What are neural networks and how to optimize them? 3. What is the deep learning model and how to use it in business? 4. Which deep learning structure should be used for a given business problem? 5. How to develop a deep learning model to solve business problems? In summary, the course will expose students to prevalent business applications of deep learning in different domains (Customer Analytics, Supply Chain Analytics, Healthcare Analytics, Financial Technology Analytics, Accounting Analytics, Talent Analytics, etc.). Upon completing this course, students will know how to build and optimize deep learning models for different business applications. 1.5 credits.