Practical Automation and Data Science

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2020 Summer Program Curriculum
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Section	Summary	Platform	Detail	What you'll be able to do upon completion	Class Hours	TA Hours	Est. Self Study Hours
1	Data Structures, Conditional Logic, Scripting	Visual Basic for Excel	History of Excel, context for automation in Excel, tradeoffs of Excel as a data science tool, Visual Basic operation in Excel, debugging in Visual Basic, conversion between data types, introduction to automation.	Open the Visual Basic software scripting interface and connect it to projects in Excel, use it to manipulate data in Excel, understand the context and limitations, and be able to research methods and continue to build Visual Basic knowledge on your own in the future.	4	1	3
2	Loops, Flexible Input, Automation	Visual Basic for Excel	More logical tools for scripting, advanced interaction between Visual Basic and Excel, automation of various example workflows, manipulation of data in preparation for data science.	Write more advanced scripts handling variable amounts of data, import data from across multiple locations, as well as use loops and subfunctions to create workflow automation tools and prepare data for data science methods.	4	1	4
Individual Evaluation 1			A one-on-one assessment of your understanding.	Know what software development concepts you can discuss with competence and which need more work. Follow up through exploring specific free resources best for you personally to continue to hone your skills toward your goals related to Excel and software development generally.	-	0.3	-
3	Scripting Environment, Data Structures	Python	History of Python, set up and scripting, new data structures, Python differences from Visual Basic, debugging in Python, tradeoffs of Python for data science, conversion between data types.	Open Python software scripting interfaces and connect them to data sets, use more advanced data types to accomplish a broader range of tasks, easily choose between Excel and Python for a given task.	4	1	3
4	File Input/Output, Automation	Python	Reading from and writing to files, user input handling, automation of various example workflows, manipulation of data in preparation for data science.	Write more advanced scripts handling larger amounts of data, import data to and exporting data from various locations, create workflow automation tools to complement Excel tools, and prepare data for data science methods.	4	1	4

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Individual Evaluation 2			A one-on-one assessment of your understanding.	Know what more advanced software development concepts you can discuss with competence and which need more work. Follow up through exploring specific free resources best for you personally to continue to hone your skills toward your goals related to software development.	-	0.3	-
5	Software Package Creation, Data Visualization	Python, Visual Basic for Excel	From scripts to full software packages, best practices for sharing your tools with others, process visualization tactics, larger automation projects, data science for automation.	Create larger software packages capable of executing more complex goals for users aside from yourself. Achieve support for your software by visualizing your results clearly using methods to make your underlying logic transparent. Use data science methods to assist in your automation processes.	4	1	2
6	Data Analysis, Intro to Advanced Data Science	Python	Methods for data evaluation, data cleaning, data imputation, sample preparation, definition and categories of machine learning.	Use Python libraries to gain quick insights across large data sets, drive excellent decisions from clear data and strong logic. Utilize machine learning when helpful and dodge common related pitfalls experienced by many firms.	4	1	4
Individual Evaluation 3			A one-on-one assessment of your understanding.	Know where you stand in the journey toward professional software development for data engineering and data analysis and what you can do to further develop your skills to reach your personal goals.	-	0.3	-
7	Data Science Regression Techniques	Python, Visual Basic for Excel	Linear Regression, Logistic Regression, Random Forest	Make performance predictions, find optimal values, uncover important relationships, and eliminate false assumptions across your organization.	4	1	3
8	Data Science Classification Techniques	Python, Visual Basic for Excel	K-Nearest Neighbors, Support Vector Machines, K-Means	Categorize entities important to your firm to drive strategies, discover categories for these entities and use them to redefine the entities, uncover important relationships, and eliminate false assumptions across your organization.	4	1	3

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Individual Evaluation 4			A one-on-one assessment of your understanding.	Know what is lacking in your understanding of the powerful data science methods covered in the course and their interactions and distinctive use cases. Follow up by using more resources to perfect your data science project scoping capabilities and handle any related interview.	-	0.3	-
9	Optional: Introduction to Neural Networks	Python, Visual Basic for Excel	Underlying intuition and history, key elements, mathematical derivations, steps in deployment, and available tools to implement.	Understand the basics of neural networks and how they fit into the world of data science.	3	-	-
10	Optional: Capstone Project	Python and/or Visual Basic for Excel	You work together one-on-one with a mentor to scope a manageable individual project and then execute and publish it for the world to see.	Point to and clearly explain a professional valuable process automation or data science project free for the world to evaluate and use.	-	3	-