Course Syllabus: AIT-580 Analytics: Big Data to Information [Credits: 3], Fall 2018
Sections 001, DL1
Instructor: Prof. Harry J. Foxwell

Catalog Description:

This course provides an overview of Big Data Analytics concepts, tools, and methods, and their use in commercial, scientific, governmental, social, and other application areas. Topics include technical and non-technical disciplines required to collect, process and interpret enormous amounts of data available from numerous public sources. Course content includes discussions of, and hands-on practice with, technologies involved in collecting, mining, analyzing, visualizing data, and interpreting the results. Additional topics covered include system infrastructure and acquisition, law and policy, and ethical issues related to data collection.

This course is currently one of the core requirements for the IT Management in Federal Sector concentration for the MS in Applied Information Technology; it can also be taken as an elective for the MS/AIT concentrations.

Prerequisite(s): Graduate Standing
Recommended recent previous courses: programming, statistics

The course includes but is not limited to the following topics, and emphasizes the technical aspects of Data Analytics projects:

- characteristics and representations of data
- architecture of data analytics systems
- tools for conducting data analytics research
- role of the Data Scientist and the Data Analytics Project Manager
- Public Big Data resources
- Big Data Use Cases in Social Media, Government, and Industry
- principles of statistical analysis
- querying data using SQL, R, Python, and other software tools
- data visualization concepts and methods
- data governance, security, curation, privacy, legal, and ethical issues
- machine learning and predictive analytics

Course assignments include:

- Big Data case study
- Topic-specific research papers
- Discussions of Big Data Analytics topics
- Lab exercises using Data Analytics software
- Data Analytics project

Required Course Material:

Required Textbook:

Recommended Statistics book:
Practical Statistics for Data Scientists, P.Bruce, 2017, O'Reilly Media
Other Recommended Resources:

  o https://www.nostarch.com/bookofr
- An Introduction to Statistical Learning with Applications in R, G. James, et al., 2016 Springer
  o http://www-bcf.usc.edu/~gareth/ISL/index.html
- Tutorials:
  o A variety of tutorials (SQL, R, Statistics, Python, etc.) are available at http://lynda.gmu.edu/ and at https://dsc.gmu.edu/
  o Seeing Theory: http://students.brown.edu/seeing-theory/
  o The Statistics Tutor’s Quick Guide to CommonlyUsed Statistical Tests
  § www.statstutor.ac.uk/resources/uploaded/tutorsquickguidetostatistics.pdf

There will be required Web-based readings and tutorials, along with recommended resources. These will be listed on the course Blackboard site’s Course Resources link and within individual assignment links.

Other Expectations:

- Some familiarity with…
  - Linux operating system
    - adding Linux VM to Windows or to OS X using VirtualBox
  - Programming concepts
    - using R, Python, Tableau, other data analytics tools
  - Basic statistics
- …if not:
  - self study, tutorials, books, etc
  - ask lots of questions!
  - see Course Resources page on Blackboard

Course dates: Week of August 27 through week of December 17

AIT-580-001:
Classroom Location: Innovation Hall 215G
Meeting Times: Tuesdays, 7:20 pm - 10:00 pm

Note for online section AIT-580-DL1:
This section is designed for "asynchronous" delivery
( see https://masononline.gmu.edu/why-online/course-delivery-methods/ )
However, there will be optional weekly online meetings on Blackboard Collaborate Ultra
for students who wish to interact directly with the instructor;
there will be no penalty for non-participation in those online meetings.
These online meetings will be recorded.
Online students are welcome to attend the on-campus class meetings (assuming seating availability).

Blackboard: mymason.gmu.edu All assignments, class announcements, schedules, files and presentations will
use Blackboard;
online sections will include sessions using Blackboard Collaborate Ultra (See the Blackboard Tools menu).


Professor's Email: hfoxwell@gmu.edu
In the Subject line of your email, use the prefix AIT580-Section#:
For example: Subject: AIT580-DL1: Question about Assignment #1
University policy: all course related communications must use faculty and student Mason email addresses.
Office location: Research Hall 434  
Office hours: Mondays and Wednesdays 1:00pm - 5:00pm, and by appointment  
Phone: 703-304-3838 (mobile), 703-993-5931 (office)  
Text: 703-304-3838

Graduate Teaching Assistant (GTA): Rachana Salla, rsalla@masonlive.gmu.edu  
Office Hours: Call or email the GTA to arrange appointment day/time/location  
The GTA assists with understanding assignments and with grading.

Grading Policy

Student grades will be determined based on class participation, general assignments & lab exercises, case studies and reports, and final evaluation/assignment:

<table>
<thead>
<tr>
<th>Grade Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>General assignments &amp; lab exercises</td>
<td>30%</td>
</tr>
<tr>
<td>Case studies and reports</td>
<td>35%</td>
</tr>
<tr>
<td>Final evaluation/assignment</td>
<td>35%</td>
</tr>
</tbody>
</table>

Grading Guidelines: Some grade components are evaluated subjectively:

- A: consistently above and beyond the course/assignment requirements
- B: meets and occasionally exceeds the course/assignment requirements
- C: minimally meets the course/assignment requirements
- F: fails to meet the course/assignment requirements

Honor Code

All work performed in this course will be subject to GMU's Honor Code. Students are expected to do their own work in the course unless a group project is approved by the instructor. In papers and project reports, students are expected to write in their own words, rather than cutting-and-pasting from sources found on the Internet. The goal of assignments is to demonstrate what you have learned, not what you can google. When you do use text or graphical material from books, articles, and the Web, enclose the material in quotes and provide a complete and proper reference. If a paragraph is used then it should be indented in the text (both left and right margins). In-text citation can use the [Author, Year] format or the Numerical [1] format which must refer to the source in the References section of your assignment. Use Chicago Manual of Style for guidance on citation style, usage, etc. (Don't buy the big CMS. See the smaller A Manual for Writers by Kate Turabian). Regardless of the citation method used, proper citations always include: Author(s), Title, Publication Date, Publisher, and URL (if from the Web, along with Last Accessed Date). BlackBoard's SafeAssign service will be used to review selected student assignments.

NOTES:

- Wikipedia is not a primary reference. Use it for initial discovery, but use and cite primary references (which Wikipedia itself might use).
- If you need assistance with writing an assignment, you can get assistance here: http://writingcenter.gmu.edu
- The first item Prof Foxwell looks at in major assignments is your References section!
- Any programming/coding assignments must adhere to the CS Honor Code.
Assignments

Submission format: Unless otherwise specified, all assignments must be submitted to Blackboard as PDF files. Do not email them to the instructor or TA unless you are having difficulty with Blackboard. Generally, you are permitted two submission attempts (for minor corrections if needed); if you do resubmit an assignment, let the TA know in case the first attempt was already graded. Use the following filename format: Lastname-AssignmentName.pdf. For example: Foxwell-Assignment1.pdf

There are several Computer Labs available for general use by students, which are located on the Fairfax campus. For more information go to the web site at [http://labs.vse.gmu.edu/](http://labs.vse.gmu.edu/). Otherwise, students are expected to use their personal laptops and university instructional computing resources for course work.

Class Participation: Contribute actively and participate in classroom and/or online discussion topics including those posted on Blackboard.

Other Notes:

- There will be significant reading assignments along with the assumption that you have actually read them.
- Lecture slides from instructor's material will be posted on Blackboard; lecture material will be asked about on assignments and on final evaluation.
- Some material you may already know (good! that's review!) Some material you may have learned earlier and have forgotten (good! you'll be reminded) Some material you may know more than the instructor (good! share it!).
- Call or email the instructor if you anticipate being unable to meet any course requirements in a timely manner.
- Personal Safety and Security: The Mason Alert system provides emergency information of various sorts. Students can sign up for it by visiting the website [https://alert.gmu.edu](https://alert.gmu.edu). Students are also reminded that an emergency poster exists in each classroom explaining what to do in the event of crises and that further information about emergency procedures exists on [http://www.gmu.edu/service/cert](http://www.gmu.edu/service/cert).