

## **Data Programming**

Course Number: Combined Sections INFSYS 3830-001 LEC (14162) & INFSYS 6830-001 LEC (14428)  
& FINANCE 3572-001 LEC (14490) & FINANCE 6572-001 LEC (14421)

Class: Online (Spring, 2020)

### **About the Instructor**



#### **Instructor:**

Vivek Kumar Singh, Ph.D.

Office location: ESH 228,

Email: [vsingh@umsl.edu](mailto:vsingh@umsl.edu)

Virtual office hours: Wednesday (4:00 PM to 6:00 PM) every week via Zoom and by appointment via email. The Zoom link will be posted in “Modules” section of course canvas each week.

#### **About this course:**

The course introduces two data programming languages – R programming and Python programming. Unlike traditional programming languages, data programming languages are more convenient to code, easy to execute, and provides useful libraries for data analytics. This course will teach programming concepts in above programming languages with hands-on exercises.

**Course Identifiers:** Following are the combined sections:

1. FINANCE 3572-001: Financial Data Programming (Internet)
2. FINANCE 6572-001: Financial Data Analytics (Internet)
3. INFSYS 3830-001: Data Programming (Internet)
4. INFSYS 6830-001: Data Programming for BI (Internet)

**Course Description:** In this course, you will learn two data programming languages – (1) R – Programming, and (2) Python Programming. Both these data programming languages are important for students aspiring for careers in data analytics, machine learning, Artificial Intelligence, and Cyber Analytics.

- *The course will cover fundamentals of R – Programming with Hands-on examples and exercises for first four weeks. In the following four weeks, students will learn fundamental concepts of Python – Programming with examples and hands-on exercise.*
- *Students will learn to analyze both structured (tabular data such as excel) and unstructured data (text data such as social media).*

- *The learning methodology will involve weekly programming assignments, discussions, and a multiple-choice questions based end-term exam (see below sections for more details).*

**Course Objectives, Goals, or Learning Outcomes:**

The students will be able to program using R and Python programming languages at the end of the course. They will understand the importance and requirement of data programming languages which is a crucial skill required to succeed in emerging fields such as data analytics, Artificial Intelligence, and Cyber Analytics. The course especially focuses on learning through hands-on exercises and assignments/quizzes. This course will enable students to learn data analytics and cyber analytics advanced course in undergraduate and graduate programs.

**Materials – Required and Recommended:**

Required

- Learning Python by Mark Lutz, 5<sup>th</sup> Edition, O'Reilly Media.
- Analyzing Financial Data and Implementing Financial Models Using R, Springer.
- An Introduction to R - Notes on R: A Programming Environment for Data Analysis and Graphics (Version 3 - 2018) <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>

Recommended

- Supplement book for R programming (Optional): R Cookbook 2nd Edition (ISBN 9781492040682)

**Evaluation Criteria and Grading:**

- There will be one individual assignment each week. This assignment will cover programming concepts taught during the week. Each assignment should be submitted before 11:59 PM on the due date.
- There will be one final exam including multiple-choice questions.

**Grading criteria**

Items	Percentage points	Individual/Group
Assignments	60%	Individual
Discussions	20 %	Individual
Final exam	20%	Individual

**Note:** Late assignments are evaluated by exception only and are subject to late penalty.

**Grading Scale:** The UMSL Grading System is based on a four-point scale. The grade value for each letter grade is as follows:

A = 4.0	B- = 2.7	D+ = 1.3	EX = Excused
A- = 3.7	C+ = 2.3	D = 1.0	DL = Delayed
B+ = 3.3	C = 2.0	D- = 0.7	FN = Failure/Non-Participation
B = 3.0	C- = 1.7	F = 0	

Name:	Range:	
A	100 %	to 94.0%
A-	< 94.0 %	to 90.0%
B+	< 90.0 %	to 87.0%
B	< 87.0 %	to 84.0%
B-	< 84.0 %	to 80.0%
C+	< 80.0 %	to 77.0%
C	< 77.0 %	to 74.0%
C-	< 74.0 %	to 70.0%
D+	< 70.0 %	to 67.0%
D	< 67.0 %	to 64.0%
D-	< 64.0 %	to 61.0%
F	< 61.0 %	to 0.0%

### Course Schedule (January 21<sup>st</sup>, 2020 - March 15<sup>th</sup>, 2020)

Date/Week	Topic	Reading/preparation	What's due
Week 1 (Jan 21 <sup>st</sup> , Tuesday - Jan 26 <sup>th</sup> , Sunday)	Course introduction, Introduction to R, R software and R studio software installation, R console, Code formatting guidelines, Working with multiple files, Packages	An Introduction to R textbook - Chapters 1 and 13	Assignment 1 due Jan 26 <sup>th</sup> , Sunday at 11:59 PM
Week 2 (Jan 27 <sup>th</sup> , Monday – Feb 2 <sup>nd</sup> , Sunday)	Vectors, Special Numbers and Missing Values.	An Introduction to R textbook - Chapters 2	Assignment 2 & Software setup – R Programming due Feb 2 <sup>nd</sup> , Sunday at 11:59 PM
Week 3 (Feb 3 <sup>rd</sup> , Monday – Feb 9 <sup>th</sup> , Sunday)	Objects, Array, List and Dataframe, Tables	An Introduction to R textbook - Chapters 3, 5, 6, and 7.	Assignment 3 due Feb 9 <sup>th</sup> , Sunday at 11:59 PM
Week 4 (Feb 10 <sup>th</sup> , Monday – Feb 16 <sup>th</sup> , Sunday)	Conditional, Loops, and Functions.	An Introduction to R textbook - Chapters 9 and 10.	Assignment 4 due Feb 16 <sup>th</sup> , Sunday at 11:59 PM
Week 5 (Feb 17 <sup>th</sup> , Monday – Feb 23 <sup>rd</sup> , Sunday)	Introduction to Python, Anaconda and Jupyter installation.	Learning Python textbook - Chapters 1, 2, and 3.	Assignment 5 & Software Setup – Python Programming due Feb 23 <sup>rd</sup> , Sunday at 11:59 PM

Week 6 (Feb 24 <sup>th</sup> , Monday – Mar 1 <sup>st</sup> , Sunday)	Built-in data types, Conditionals, and Loops.	Learning Python textbook - Chapters 4 and 5.	Assignment 6 due Mar 1 <sup>st</sup> , Sunday at 11:59 PM
Week 7 (Mar 2 <sup>nd</sup> , Monday – Mar 8 <sup>th</sup> , Sunday)	Loops and Comprehensions.	Learning Python textbook - Chapter 14.	Assignment 7 due Mar 8 <sup>th</sup> , Sunday at 11:59 PM
Week 8 (Mar 9 <sup>th</sup> , Monday – Mar 14 <sup>th</sup> , Saturday)	Final Exam		Final Exam due Mar 14 <sup>th</sup> , Saturday at 11:59 PM

**General Education:** This course meets the Gen Ed requirement(s) for these goals: Proficiency in computer programming skills and learning analytical thinking.

<b>General Education Goal</b>	<b>How this course meets the goal:</b>	<b>How the goal is assessed:</b>
<i>Proficiency in the basic computer programming skills</i>	<i>Hands-on exercise to learn data programming using R – Programming and Python Programming.</i>	<i>Weekly Assignments and final exam which involves programming questions.</i>
<i>Analytical thinking</i>	<i>Assignments require students to think critically to solve data programming challenges which involves data preparation, transformation, and modeling.</i>	<i>Students answer a business question in the assignment using data programming.</i>

**Instructional Strategies:** The course is fully online. Each lecture consists of discussions of material and programming demonstrations. The assignments are individual. The Canvas will be used to post assignments and submissions. The students are expected to check Canvas for course updates and grades. Students are encouraged to meet and discuss during virtual office hours if they face any queries related to course content, assignment, and final exam. Student should also contact the course instructor via email in case of any difficulty related to this course.

**Communication Strategies:** Important information is available to you through MyConnect. Throughout the term, you may receive emails regarding your course grades or academic performance. Please pay attention to these emails and consider taking the recommended actions. They are sent to help you be successful!

**Course Policies:**

1. **Participation** (expectations)

- It is vitally important that our virtual classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions in online. Please email me or speak with me before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without my authorization and the permission of others who are recorded.
- Your success in this course will heavily depend on your ability to communicate, engage and participate in all course activities. Successful completion of this course requires that a student keep up with all assignments, and coursework. Active participation in discussions is a very important part of this course and participation in these discussions, and other

activities as assigned, is not optional. You are expected to prepare for each online class period. Daily preparation is essential to steady and sustained learning in this course.

Lack of preparation for online class negatively affects your learning.

- If you are unable to participate in the scheduled online course and assignments, you must notify the instructor within the week of that class period. The instructor reserves the right to make judgment to accept and/or make-up assignments missed because of failed participation in the online course activities.
- **E-mail etiquette:** E-mails to faculty are a type of professional communication. They should include an appropriate salutation and your name at the bottom of the message. If the answer to your question can be found in your notes, text, or assignment, then first consult the appropriate resources such as this syllabus. This is an important skill to acquire, practice, and demonstrate while in college. Please think about what you are asking and saying before hitting “send.” I’ll try my best to respond to e-mail messages within 24 hours.

## 2. Attendance Policies

- There are no *Attendance* in class since it is a fully online course.
- Make-up tests are provided in only special cases. *A make-up test may be offered only if the absence is documented (doctor’s note, evidence of emergency) and only if you contact your instructor prior to the test.*
- Assignments are due as per the schedule. Points will be deducted for each day that the report is overdue.
- Create a plan to ensure assignments will be submitted on time as I do not accept late work.
- UMSL does not have a grade of Incomplete or I. Please speak with me early to resolve problems you encounter.
- Class participation is essential for success. When you are not able to participate, it is your responsibility to clarify missed assignments with me.
- If you expect to miss class to participate in a university-sanctioned activity, be sure to submit a [Student Absence Form](#) early in the semester so that we can discuss your responsibilities and make plans to fulfill the requirements of the course you will miss.
- If you expect to miss class due to a religious observance, early in the semester submit a Request for [Student Absence for Religious Observance](#) so that we can discuss your responsibilities and plan so that you meet course obligations and requirements.
- Please make an appointment to discuss with me any requests for exceptions to these policies.

## 3. Academic Integrity/Plagiarism

- You are responsible for being attentive to and observant of University policies about academic honesty as stated in the [University’s Campus Policies](#) and [Code of Student Conduct](#) found in the UMSL Bulletin.
- Academic dishonesty is a serious offense that may lead to [probation, suspension, or dismissal from the University](#). One form of academic dishonesty is plagiarism – the use of an author’s ideas, statements, or approaches without crediting the source. Academic dishonesty also includes such acts as cheating by using any unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work or engaging in any behavior specifically prohibited by the faculty member (e.g., copying someone else’s answers on tests and quizzes). Unauthorized possession or distribution of academic materials is another type of academic misconduct. It includes the unauthorized use, selling or purchasing of examinations or other academic work, using or

stealing another student's work, unauthorized entry or use of material in a computer file, and using information from or possessing exams that an instructor did not authorize for release to students. Falsification is any untruth, either verbal or written, in one's academic work. Facilitation is knowingly assisting another to commit an act of academic misconduct.

**Plagiarism, cheating, and falsification are not acceptable.**

- All instances of academic dishonesty will be reported to the Office of Academic Affairs who will determine whether you will appear before the Student Conduct Committee for possible administrative sanctions such as dismissal from the university. The instructor will make an academic judgment about the student's grade on that work in this course. The campus process regarding academic dishonesty is [described in the "Policies" section of the Academic Affairs website](#)
- Citations should be included in APA format.
  - A. Plagiarism is the use of another person's words or ideas without crediting that person. Plagiarism and cheating will not be tolerated and may lead to failure on an assignment, in the online class and dismissal from the University, per the [UMSL academic dishonesty policy](#).
  - B. Students are responsible for being attentive to and observant of campus policies about academic honesty as stated in the [Code of Student Conduct](#)
  - C. To avoid accusations of academic dishonesty, please submit all written work to the Turnitin System before finalizing what you submit for evaluation. Check information about [The Writing Center @UMSL](#).

#### 4. Online Class Behavior

- Online discussion should be civilized and respectful to everyone and relevant to the topic we are discussing. Everyone is entitled to their opinion. Online discussion is meant to allow us to hear a variety of viewpoints. This can only happen if we respect each other and our differences.
- Meaningful and constructive dialogue is encouraged in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. Respect for individual differences and alternative viewpoints will be maintained at all times in this class. One's words and use of language should be tempered and within acceptable bounds of civility and decency.
- Since every student is entitled to full participation in class without interruption, all students are expected to come to class prepared and on time and remain for the full class period.
- Disruptive behaviors, including excessive talking, arriving late to class, sleeping, reading newspapers, using unauthorized electronic devices during class is not permitted.
- Please remember:
  - Without giving up your own convictions, accept that disagreement will exist.
  - Be a respectful listener.
  - Comments are made on issues, not on individuals.
  - Comments are supported by reasons and logic.
  - Speakers take turns; don't interrupt.
  - Respectful words and strategies should be used.

- If you don't agree with a classmate, seek to understand your peer first. Begin with "Help me understand..."
- Non-verbal expressions and body language should reinforce a positive learning environment. Avoid rolling your eyes, crossing your arms in anger, or gasping out loud.
- Understand your triggers or "hot buttons." Knowing what makes you angry and frustrated enables you to manage your reactions and respond in a more appropriate manner.
- Consider how your use of technology helps or hinders a respectful learning environment.

#### 5. **Title IX Policies Mandatory Reporting:**

Under Title IX, all UMSL faculty, staff, and administrators (with limited exception) are obligated to report any incidents of sexual harassment, sexual misconduct, sexual assault, or gender discrimination to the Student Affairs office and/or other University officials. This ensures that all parties are protected from further abuses and that victim(s) are supported by trained counselors and professionals. Note: There are several offices at UMSL whose staff are exempt from Title IX mandated reporting, when the information is learned in the course of a confidential communication (e.g., Counseling Services, Health Services, Community Psychological Service, Center for Trauma Recovery, and Student Social Services).

#### 6. **Student Resources:**

##### **Access, Disability and Communication**

Your academic success is important. If you have a documented disability that may have an impact upon your work in this online class, please contact Disability Access Services (DAS) immediately. Students must provide documentation of their disability to the office of Disability Access Services in order to receive official University services and accommodations. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations. Information about your disability is confidential. Once DAS reviews your medical documentation, they will provide you with the information and steps to inform me about the accommodations to which you are entitled. Your accommodations will begin as soon as we discuss your approved accommodations.

- 144 Millennium Student Center
- Phone: (314) 516-6554
- Email: [cramert@umsl.edu](mailto:cramert@umsl.edu)
- Web: <http://www.umsl.edu/services/disability>

If you have difficulty communicating in English with the instructor of this course, contact the **Office of International Students and Scholar Services:**

- Phone: (314) 516-5229
- Email: [iss@umsl.edu](mailto:iss@umsl.edu)
- Web: <http://www.umsl.edu/~intelstu/contact.html>

## Technical Support

UMSL provides students with a variety of technology supports on campus. The information listed below connects you with the most commonly sought supports.

Canvas: If you have problems logging into your course, or an issue within the course site, please contact the **Technology Support Center**:

- Phone: (314) 516-6034
- Email: [helpdesk@umsl.edu](mailto:helpdesk@umsl.edu)
- Web: <http://www.umsl.edu/technology/tsc/>

If you are having difficulty with a technology tool in Canvas (Voicethread, Kaltura, etc.) explore these websites with more information about each toolset:

- Learning Resource Center: <http://www.umsl.edu/technology/lr/>
- Center for Teaching and Learning:  
<http://www.umsl.edu/services/ctl/techguides/studenttechguide.html>
- VoiceThread Support: [pro-support@voicethread.com](mailto:pro-support@voicethread.com) or  
<https://voicethread.com/support/howto/Basics/>
- Google Apps for UMSL: <http://www.umsl.edu/technology/google-apps/>

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## Academic Support

**The Writing Center** provides free face-to-face as well as online writing consultations. For face-to-face consultations, please make an appointment online at [www.umsl.mywconline.com](http://www.umsl.mywconline.com) or visit 222 SSB. At their Canvas site, students can send their papers to our tutors, who will read them and send them back with suggestions. Students can also access Turnitin, which identifies quoted material in their essays.

- Visit the [online Writing Lab page](#) to submit drafts online.
- We try to respond within 48 hours, but it may take longer, so allow ample time.

## Tutoring Services

- Academic Support Centers across campus:  
<http://www.umsl.edu/services/sea/Student%20Success%20Network/academicsupport.html>
- **NetTutor**: Online tutoring tool in many subjects is now available through NetTutor. Students can get real-time, personal tutoring via video conference. In your courses on Canvas, click on Tools and select NetTutor® to log in.

**MyConnect**: Provides you with a central location to connect to the support services on campus. MyConnect makes it easy to schedule a meeting with your instructor, advisors or counselors. It can help you manage the steps you need to take to stay on track and meet your educational goals. Log in to your UMSL MyConnect Home page by going to Current Students from the UMSL website. Then, access MyConnect through the [MyGateway Student Portal](#).



**Student Enrichment and Achievement** offers assistance tailored to specific student needs.

- 107 Lucas Hall
- Phone: (314) 516-5300
- Email: [umslsea@umsl.edu](mailto:umslsea@umsl.edu)
- Web: <http://www.umsl.edu/services/sea>

### **Campus Safety**

- All members of the UMSL community are encouraged to register their home, cell, and office phone numbers to receive notification of any pending danger on campus. Find instructions here: <http://safety.umsl.edu/police/notification/index.html>
- In the event of an emergency on campus, call Campus Police at 314.516.5155. A call to 911 on a cell phone only, will go to the St. Louis County Police. The St. Louis County Police will notify UMSL Police, but this may cause a delay in response. Campus Police know the best way to escort emergency vehicles to locations on campus. ○ If you do not feel comfortable walking to a parking lot, MetroLink stop, or anywhere else on campus, contact the Campus Police for an escort: 314.516.5155.
- The University of Missouri – St. Louis is committed to creating and maintaining a safe environment for all members of the campus community (faculty, staff, students and visitors). Please familiarize yourself with campus emergency procedures by reviewing the UMSL Police Department web pages at: <http://safety.umsl.edu/police/emergency/index.html>. These pages highlight possible safety concerns and alert you to procedures to follow should there be an emergency on campus. The site also includes a link to the campus plan for disaster preparedness. It is important to review this information and be prepared to take action in the event of an emergency. If a person's safety is ever at risk, **call the Campus Police at 314-516-5155 immediately.**

The Center for Teaching and Learning's website includes sample statements of civility, academic honesty, and disability access. These are available for faculty to adapt at: <http://www.umsl.edu/services/ctl/faculty/resourcesforteaching/index.html>

Some departments expect all syllabi to include standard statements of these policies in each course syllabus. Be certain to check whether this is the case in your program.

Revised December 1, 2019