

**Supply Chain Management**  
**Course Number: 33:799:475**  
**Course Title: Supply Chain Analytics Essentials**

## **COURSE DESCRIPTION**

In this introductory course to Supply Chain Analytics, I will take you on a journey to this fascinating emerging area of integrating data analytics with supply chain management via tools such as Excel and Python. I will show you real life stories and examples to demonstrate how analytics can be applied to various domains of a supply chain to generate a significant social and / or economic impact. I will also talk about the job market trend, job requirement and preparation. Supply Chain Analytics is a fast developing area. Thus this course is by no mean exhaustive. My goal of this course is to open the eyes of the learners to the impact and some essential skills of Supply Chain Analytics, and hopefully this will encourage you to learn more. At the end of the course, you will practice the skills learned by doing a real-life data driven project in the area of supply chain management.

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## **COURSE MATERIALS**

A **Course-pack** is required for the course, which includes required simulation and reading materials.

### **Software**

In this course, we will use Microsoft Excel, Tableau and/or Python (Anaconda). Either Excel 2003, 2007 or 2010 will be fine. Please install the following Excel Add-Ins before class starts: "Analysis ToolPak".

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## **LEARNING GOALS AND OBJECTIVES**

The objective of the course is to introduce data-driven models, skills and tools so that the learners can manage supply chains efficiently and effectively. Specific objectives include

Providing an overview of supply chain intelligence and analytics as applied in today's global marketplace.

Developing critical thinking in support of competition strategies in supply chain management.

Enhance essential data analytics skills in various domains of a supply chain, including sales and operations planning and sourcing.

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## **PREREQUISITES**

## **ACADEMIC INTEGRITY**

*I do NOT tolerate cheating.* Students are responsible for understanding the RU Academic Integrity Policy <http://academicintegrity.rutgers.edu/>

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. See [business.rutgers.edu/ai](http://business.rutgers.edu/ai) for more details.

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## **TEACHING METHOD**

The course will be taught using PowerPoint presentations and instructional simulation. In each week, we will complete one lecture and all the associated readings, simulation, exercises and homework (see attached schedule). Class-related material (lecture notes, videos, homework and solutions, etc.) will be posted online. Students should be enrolled to access the posted materials.

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## **HOMEWORK ASSIGNMENTS**

Homework assignments should be typed and handed in paper copies in class. Be sure to put your name and contact information (email and optional telephone) on all homework submitted. Team work is expected for some assignments (to be specified in lectures), but team members must specify on the homework the percentage of work done by each of its members (for example, if everyone contributes equally in a 4-student team, then the percentage of work done by each student is 25%).

Assignments of a class are due by the next class, unless otherwise stated. Penalty for late submission (within 1 week) is 40% of the points allocated to the assignment. Submission will not be accepted if it is more than 2 weeks late.

### **Simulation Assignment**

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Please write down the most compelling learnings from the in-class simulation (for each simulation) and provide any feedback and suggestion that you may have. This is a group assignment, and it follows the same rule on the due date and late submission as the homework assignments.

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## **PROJECT AND PRESENTATION**

A term project on a supply chain analytics-related topic is a necessary part of the course. Each project should be a team effort of 4-5 people assigned by the instructor in the first two weeks. Each project team

will select a topic of interest (following the guidelines listed below), make a proposal (on the story, the problem, and your solution approach) and make a thorough presentation for about 10-15 minutes towards the end of the semester (see weekly schedule for dates). Every team member must present (detailed requirements for the project are noted below). **Each team member must specify his/her percentage of contribution on the final submitted work. The project will be graded as a whole but each team member's grade also depends on his/her contribution.**

Select one of the two formats below (an analytics-case or technology) and follow carefully the reporting instructions. If you want to do a project that does not obviously fall within the suggested categories, please contact me for permission. In any event, please select a topic that will be a benefit to the class. You may be as original and creative about the topic as you can be, but please keep your fellow classmates in mind.

### **I. Supply Chain Analytics-Case**

Describe the application of analytics to a real-life supply chain problem by presenting the story, data and facts, and applying the methods/tools of this class. Please also include and be prepared to discuss implementation issues. You can draw on your own work experience (that would likely be most interesting to the class) or study a case appeared in the literature or press. Avoid the very popular press or a shallow source. Rather, look for a serious professional article, such as a financial magazine (Wall Street Journal, New York Times, BusinessWeek), economics magazine, or a trade magazine (Sloan Management Review, Supply Chain Management Review, Inbound Logistics, etc.).

### **II. Supply Chain Analytics-Technology**

First, select a novel data analytics and/or science technology, software or platform (for short, technology), and describes its contribution (or projected contribution) to the current state of art. It would be most useful if you have been exposed to the technology on your job, and can report on first hand. Examples of interest are big-data collection, processing, analyzing and visualization tools, software packages and platform, new practices of applying data analytics to supply chain operations, or anything else that is of interest to you and would likely interest class members, but within the domain of supply chain analytics. If in doubt, contact me.

Second, **research the current state of the chosen technology** and summarize it in your report. Find out the current or emerging commercial "players", and look at their future technological directions. Based on at least three sources (ordinary articles or Web pages, to be referenced in your report), address at least the following points using data and facts:

What are the key technical and economical aspects of the technology which benefit the marketplace (consumers of this technology, both individual and corporation)?

Who are the current "movers and shakers" in this area? Compare and contrast their technological and business approaches, products, etc.

What are the current impediments to their approaches for acceptance in the marketplace? Examples are functionality, ease of use, price, technological longevity, etc.

Third, based on the current state of the technology, **express your personal opinion and conclusions on the future** of the chosen technology and its applications. Make sure your arguments are logical and backed by your research; you are encouraged, however, to voice opinions gleaned from your personal "crystal ball" (convictions and intuition), but be reasonable (and brief. . . ). You may attach to your report supporting material, such as graphs and charts. Remember, anybody can collate material from the Web, but it is more difficult to analyze such material and reach conclusions. Analysis and conclusions will be the components of your term project most heavily weighted.

**Note:** You should not cut-and-paste verbatim material from Web pages or copy verbatim material from any other sources, unless you use that material as exact quotes. In that case be sure to enclose any pasted text material in double quotes and to provide an exact reference for it! All pasted graphs and charts should also be properly referenced. If you are unsure about referencing materials, please see the Academic Integrity information on Canvas and/or the Academic Integrity at Rutgers webpage.

**III. Submission**

The project is due in the last week of the course (see weekly schedule). We will have in-class presentations so that teams can learn from each other. Prior to the presentation, each team should submit three (3) documents through Canvas:

A PowerPoint file for the presentation.

A Word document that includes background, assumptions, models/ plans, the analysis and solution/ estimates, the interpretation and citations.

An Excel file, Tableau files or R/Python code with all data and calculations.

A space will be created in the Assignment area of Canvas where your project documents are to be submitted.

**GRADING POLICY**

A mid-term exam will cover the first half of the course's materials. In addition, there will be homework assignments and a term project with an in-class presentation (see term project). The weights for course work components are given below.

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Simulation Assignment	10%
Homework Assignments	40%
Final exam	30%
Project & Presentation	20%
<b>TOTAL:</b>	<b>100%</b>

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**COURSE SCHEDULE**

Note that the following schedule may be modified by the instructor if necessary.

Sessions	Topics covered	Assignments
1	<b><u>Introduction</u></b> Course policy & preview; self-introduction & group, job opportunities	
2	<b><u>Overview of Supply Chain Analytics</u></b> Supply chain domains and pain points, overview of analytics applications to various supply chain domains.	<ul style="list-style-type: none"> <li>HW 1 assigned</li> </ul>

3	<b><u>Measuring Supply Chain Metrics</u></b> Little's Law, inventory turns, cash cycle, KPIs and benchmarking	<ul style="list-style-type: none"> <li>• HW 1 due</li> <li>• HW 2 assigned</li> </ul>
4	<b><u>Business Intelligence and Competitive Analysis</u></b> Geographic business information, Industry analysis, value chain analysis, competitive positioning, breakdown and value driver analysis	<ul style="list-style-type: none"> <li>• HW2 due</li> <li>• HW 3 assigned</li> </ul>
5	<b><u>Inventory Analytics</u></b> Inventory benchmarks, link inventory to financial performance, ABC analysis	<ul style="list-style-type: none"> <li>• HW3 due</li> <li>• HW 4 assigned</li> </ul>
6	<b><u>Sourcing Analysis</u></b> Procurement challenges, spend analytics, supplier management, AI in procurement	<ul style="list-style-type: none"> <li>• HW 4 due</li> </ul>
7	<b><u>Machine Learning for Supply Chain Planning</u></b> Machine learning techniques for better forecasting and planning of demand, inventory and supply, example: All-Clad.	<ul style="list-style-type: none"> <li>• HW 5 assigned</li> </ul>
8	<b><u>Natural Language Processing (Python I)</u></b> Buying process, human factors, Python - Anaconda	<ul style="list-style-type: none"> <li>• Python - Anaconda installation and basics</li> </ul>
9	<b><u>Natural Language Processing (Python II)</u></b> Supplier/ customer profiling, customer review analysis	<ul style="list-style-type: none"> <li>• HW 6 assigned</li> </ul>
10	<b><u>Natural Language Processing (Python III)</u></b> Topic modeling, customer review analysis	<ul style="list-style-type: none"> <li>• HW6 due</li> </ul>
11	<b><u>Project Proposal Presentation</u></b>	<ul style="list-style-type: none"> <li>• Project proposal due</li> </ul>
12	<b><u>Shortage Gaming and Inventory Rationing</u></b> Game: Hunger chain simulation. Case: Pandemic Influenza	<ul style="list-style-type: none"> <li>• Reading: Shortage gaming</li> <li>• Simulation assignment due</li> </ul>
13	<b><u>Student Project Presentation</u></b>	<ul style="list-style-type: none"> <li>• Project due</li> </ul>
14	<b><u>Final examination</u></b>	

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## SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at [ods.rutgers.edu](http://ods.rutgers.edu).

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email [dsoffice@echo.rutgers.edu](mailto:dsoffice@echo.rutgers.edu)]

[Rutgers University-Newark ODS phone (973)353-5375 or email [ods@newark.rutgers.edu](mailto:ods@newark.rutgers.edu)]

If you are ***pregnant***, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email [jackie.moran@rutgers.edu](mailto:jackie.moran@rutgers.edu)]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu)]

If you seek ***religious accommodations***, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email [deanofstudents@echo.rutgers.edu](mailto:deanofstudents@echo.rutgers.edu)]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email [DeanofStudents@newark.rutgers.edu](mailto:DeanofStudents@newark.rutgers.edu)]

If you have experienced any form of ***gender or sex-based discrimination or harassment***, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: [https://cm.maxient.com/reportingform.php?RutgersUniv&layout\\_id=7](https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7) . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu). If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email [run.vpva@rutgers.edu](mailto:run.vpva@rutgers.edu)]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.rutgers.edu> .

If you are a military **veteran** or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of **mental health** services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of **physical health** services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of **legal** services, please use our readily available services: <http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to **English as a second language (ESL)** should contact the Program in American Language Studies for supports.

[Rutgers–Newark: [PALS@newark.rutgers.edu](mailto:PALS@newark.rutgers.edu)]

[Rutgers–New Brunswick: [eslpals@english.rutgers.edu](mailto:eslpals@english.rutgers.edu)]

If you are in need of additional **academic assistance**, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>]

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]