



Northeastern University

College of Engineering

Multidisciplinary Graduate Engineering Course Syllabus

Course Information

Course Title *Big Data System Engineering with Scala*

Course Number *CSYE7200*

Term and Year *Fall 2022*

Credit Hour: 4

Location: <https://northeastern.instructure.com/courses/123492>

Instructor Information

Full Name: *Robin Hillyard*

Email Address: *r.hillyard@neu.edu*

Technical/Course Materials Requirements

- **Required textbook:**
- **Optional Materials:**
 - ***Programming in Scala***—Odersky, Spoon & Venners, Artima (4th edition)
 - ***Functional Programming in Scala***—Chiusano & Bjarnason, Manning
- **List any Software or Hardware students need to complete this course.**
 - ***Scala 2.13.8***
 - ***SBT 1.5.5 (or later)***
 - ***IntelliJ IDEA (recommended)***

Course Description/Prerequisite

Use the one from the official description in the Course Catalog. Include any course pre- or co-requisite or other requirement to enroll in the course.

This course is designed to give you an introduction to the world of functional programming and its importance in the areas of reactive programming (for concurrent systems) and Big Data. We do this by learning Scala and Spark and, in particular, how Spark was built on top of Scala. Please note that most of the lectures concentrate on Scala and functional programming, rather than Spark and Big Data. Above all, this is a *practical* class: you will learn many aspects of programming and software engineering that are useful whatever language you are using.

Scala 3 has been released and we will be covering the differences from 2.13. For now, 2.13.6 and 3.0.1 are essentially compatible.

Student Learning/Course Outcomes (SLOs)

Specialized Knowledge	Broad and Integrative Knowledge	Applied and Collaborative Learning	Civic and Global Learning	Experiential Learning
<i>Scala, Spark, Akka, techniques for proper data ingestion.</i>	Functional programming, monads, actors.	How to build a big data system based on Scala/Spark.		

Note to Instructor: Student learning outcomes are statements indicating the measurable outcomes of the course from the learner’s perspective. They describe the intended purpose of learning: the end results of the learning experience at the course level which should be aligned with the program level outcomes recorded in the College AQA process. These statements answer the question “What should the students be able to do by the end of the course?” E.g., Based on satisfactory completion of this course, a student should be able to ...

Attendance Policy

Students are expected to complete course readings, participate in class discussions or other learning activities during the unit, and complete written assignments for each unit during the time of that unit. It is understood that there might be one week when active participation in ongoing class conversations and learning activities might be delayed.

Beyond one week time, if there is an absence or lateness in participation (1) faculty must be notified in advance; (2) grades will be adjusted accordingly.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus.

Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late.

Work submitted late without prior communication with faculty will not be graded.

Approximate Course Schedule

Week	Topic	Reading
1 and 2	Introduction to Scala, Spark and FP	

3 and 4	The Scala way	
5 and 6	Functional composition	
7 and 8	Implicits, etc.	
9 thru 14	Projects, Spark, Machine learning, other topics	

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <http://www.northeastern.edu/drc/getting-started-with-the-drc/>.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for Education specific resources, visit <http://subjectguides.lib.neu.edu/edresearch>.

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion

TITLE IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

In case of an emergency, please call 911.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.