# South Dakota School of Mines & Technology

# Programming Languages, Fall 2023

# CSC 461-M01 (4-0)

## Instructor Information

### Instructor's Name

Dr. Lisa Rebenitsch

### Instructor's Contact Information

*Phone:* 605-519-8811(office)or 605-394-2722 (main office)

*Email:* [lisa.rebenitsch@sdsmt.edu](mailto:lisa.rebenitsch@sdsmt.edu)

*Office:*EEP 316

*Office Hours:* Please see posted schedule, and other hours by appointment.

*Preferred contact method:* Office hours generally will be the fastest method to answer problems. If using email, I typically check 2 times a day during the work week.

## Course Information

### Course Start/End Dates

21 August – 13 December 2023

### Course Meeting Times and Location

*Time:* MWThF 11:00 -11:50 AM

*Room:* CB 205

### Course Delivery Method

This course is presented as an on-campus lecture which incorporates daily class participation. Some assignments will require attendance. Significant out-of-class work will be required to complete the projects.Additional, ungraded problems will be given for practice. Quizzes will be included**.** D2L will be used heavily for posting materials, submissions, quizzes, etc.

### Course Description

### This course consists of two parts. The first part introduces how programming languages are designed, including an introduction to the concepts of parsing and compiling. Issues related to implementation such as type checking, binding, and memory management are discussed. Secondly, the course will survey the spectrum of programming languages paradigms, including traditional imperative, object oriented, functional, and logic languages.

### Course Prerequisites

CSC 315

### Student Learning Outcomes

A student who successfully completes this course should, at a minimum, be able to:

### Apply formal language theory to understand new languages.

### Demonstrate an understanding of the fundamental programming language elements through write programs using different programming language paradigms

### Evaluate and apply OOP paradigm and design patterns to code problems.

### Course Goals

## Understand the concepts and principles of programming languages. Understand how well-known programming languages implement these concepts and principles. Gain the ability to choose an appropriate language for software development. Understand the similarities, differences, strengths and weaknesses of different programming language paradigms (procedural, object-oriented, functional, logic, concurrent). Gain the ability to learn new programming languages. Understand the basis for object oriented design.

### Course Topics

## The primary topics include how to teach yourself new languages, programming languages theory and main components, imperative languages (Java), scripting language (Python), and functional-based languages (SCALA).

## Course Materials

### Required Textbook(s) and Materials

*Programming Language Pragmatics, Fourth Edition 4th Edition by Michael L. Scott ISBN-13: 978-0124104099 ISBN-10: 0124104096*.

### Technology Equipment Needed for the Course

An internet enabled computer with install privileges with sufficient memory to install multiple IDE’s and language packs. This computer must also have an OS capable of running D2L’s Respondus quiz system. Programs will be tested with the IDE’s presented in class. You can access D2L from the [central D2L login page](https://login.microsoftonline.com/867083e6-0b14-435f-9b4e-8be26f01d84e/saml2?SAMLRequest=fZJPa4QwEMW%2fiuQek7jqanCFpUtBaEtpSw%2b9xTh2A5rYTOyfb191T6WwxwzvzZvfTCpU4zDJ4xzO9gk%2bZsAQNacDMR3tkyzrW%2bioancJTZUoaZnynpY8z7J9DwJyTaJX8GicPZAk5iRqEGdoLAZlw1LiCac8pcn%2bRZQy41IUcVombyQ6LTnGqrA5zyFMKBkb3Lux8Wi0d%2bj64OxgLMTajazI97zYQU55K1Ka7rJlijYFWrSQ5D0XXZECW0kSEt04i7Cmz95Kp9CgtGoElEHL5%2bP9nVwGlfoikrPFCbTpDXQk%2bh4Hi3JbyHX35F1w2g2krjZgf7FeNylE8CswqVfghVd1PcbYtc7H0M3bky2aT6MBWfAzhopd%2btfV5UwPS9fm9OgGo3%2biW%2bdHdYVTxGKrrKfcpH9pj8Pgvm48qAAHsqQBiVhdsf%2f%2fof4F&RelayState=55ef4c53-d197-42cc-a478-6f02ce727723&client-request-id=028f7acd-22eb-4db8-f902-0080010c0022). If you have problems, call the helpdesk at 605-394-1234 or email [helpdesk@sdsmt.edu](mailto:helpdesk@sdsmt.edu)

### Technology Skills Needed for the Course

Working knowledge of D2L and Microsoft Office are required. Windows or a Mac (for D2L quizzes), at minimum as a VM, is highly recommended.

## Course Grading

## Coursework

Coursework includes lecture attendance, quizzes, coding projects, and self-paced practice problems. Unless otherwise indicated, all work is to be done independently, and not in groups.

Lecture attendance is well correlated with final scores.

The small assignments are to ensure readiness for the class. They are also to ensure steady progress and proper pacing for the class. The format will vary but are frequently completion points.

Quizzes are intended to test on-demand skills of the theory and OOP diagramming. These will be primary done on D2L or paper, during class time.

Programming focused assignments are test applying the language paradigm to new problems. There may be an in-class quiz component to these projects to ensure on-demand skill of that language are being developed.

The semester project is group project to examine the ability to apply the theory topics in this class to a new language. This includes coding and written components.

## Attendance Policy

Class attendance is expected. Some assignments may require attendance or an excused absence with a makeup.

## Late/Make-up Assignment Policy

The following is the departmental policy.

Requests for makeup exams and late assignments will not be accepted, unless under the following situations:

* BEFORE the due date: The student must contact course staff or the CSE main office, at least 2 workdays BEFORE the due date AND has a legitimate, documented, external reason.
* AFTER the due date: Extensions requests only accepted if the following conditions are met: 1) The issue could not realistically be reported before the due date. 2) The issue was beyond your control 3) There is documented evidence. 4) The issue must also be reported as soon as reasonably possible.
* Any conditions predetermined by the instructor, provided that such conditions are described in the Syllabus.

The following reasons are considered unacceptable:

* Forgetting to submit/attend.
* Anything due to simply not starting soon enough.
* Anything that could have been known in sufficient time, including, but not limited to, travel plans, non-emergency medical appointments, family appointments, or conflicting exam times.

Alternatives can be petitioned to the curriculum committee and will be considered for truly exceptional circumstances if the student is able to provide reasonably acceptable evidence of exceptional circumstances.

## Academic Integrity

South Dakota Mines is committed to academic honesty and scholarly integrity. The [South Dakota Board of Regents Policy 2:33](https://www.sdbor.edu/policy/Documents/2-33.pdf) provides a comprehensive definition of “Academic Dishonesty”, which include cheating and plagiarism. All Instructors at South Dakota Mines are required to report allegations of academic misconduct to the Student Conduct Officer. The [South Dakota Board of Regents Policy 3:4](https://www.sdbor.edu/policy/documents/3-4.pdf) provides detailed information regarding key definitions, policy information, prohibited conduct, and the Student Conduct process adhered to at South Dakota Mines. Any student suspected of violating academic integrity standards will be reported in accordance with the process outlined on the [South Dakota Mines website](https://www.sdsmt.edu/Campus-Life/Community-Standards/Academic-Integrity/).

If you cheat on a quiz or assignment, you may fail the course. SDSMT policy *requires* me to report dishonesty before I can speak to you. If dishonesty is found, you will, at the very least, get a -100% score since cheating is worse than doing nothing. If egregious, suspension if possible. In particular, it is forbidden under any circumstances whatsoever, to exchange/post/display source code with your classmates (current or past). **The same rules apply to collaboration with people as with AI.** Please see the posted “*May and May not - Ethics*” document posted on D2L for more details. Also, students should be aware of and abide by the [SDSM&T Student Code of conduct.](http://www.sdsmt.edu/CommunityStandards/) If you have any questions whether something could be an infringement of academic integrity, please ask.

**NOTE:** I do run plagiarism checks against prior years if applicable.

## Grading and Assessment

An answer sheet is normally posted soon after the due date. Individual feedback will be given within 2 weeks of the due date, if possible, on D2L. Additional grading policies, including bonus points are posted on D2L and grading challenges are posted in the *Course Policies*module under Content.

| **Assignment Name/Description** | **Percent** |
| --- | --- |
| Small tasks (weighted by points) | 10 |
| In-class Quizzes (equally weighted) | 35 |
| 4 large coding projects (20%, 20%, 30%, 30%) | 40 |
| Semester project | 15 |
| **TOTAL** | **100** |

**Special Note Regarding Final Exams:**  Per South Dakota Mines Policy ([II-6-2](https://www.sdsmt.edu/About/Office-of-the-President/Docs/Policy-Manual/Academics/Final-Examinations/)), if you are scheduled to take three or more final/last exams on the same day during finals week, you may request that the middle exam(s) of the day be rescheduled. ***You are required to make this request of your Instructor(s) at least 30 days prior to the last day of regular classes***.

### Grading Scale

| **Letter Grade** | **Percent** |
| --- | --- |
| A | 90.5 to 100% |
| B | 80.5 to 90.5% |
| C | 70.5 to 80.5% |
| D | 60.5 to 70.5% |
| F | 0 to 60.5% |

## Academic Freedom Statement

Academic Freedom is the cornerstone upon which higher education is built.  Academic freedom, as defined by [BOR policy 1:11](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.sdbor.edu%2Fpolicy%2Fdocuments%2F1-11.pdf&data=05%7C01%7CKurt.Katzenstein%40sdsmt.edu%7C9e374c24f5cb4c66e3ad08db1a8f756c%7C867083e60b14435f9b4e8be26f01d84e%7C0%7C0%7C638132975677651749%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=fZTiA49GsLHArEhGl2nB7H0QLMKhReMsqJDs1kjL%2BWs%3D&reserved=0), is fundamental to the advancement of truth, development of critical thinking, promotion of civil discourse, and contribution to the public good.  Each course includes the freedom to discuss relevant matters and present various scholarly views in the classroom, as determined by the subject-matter expertise of the instructor.  Students are encouraged to develop the capacity for critical thinking and to pursue the truth, debate ideas, express and evaluate their opinions, and draw conclusions. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.1

*1Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".*

## Complaint Process

While we hope that every student has a meaningful and positive experience at South Dakota Mines, should a concern arise, students are encouraged to first attempt to resolve their concern directly with the person or office directly involved. Following that attempt, should the concern remain unresolved, students are encouraged to reach out to the Dean of Students office at [DeanOfStudents@sdsmt.edu](mailto:DeanOfStudents@sdsmt.edu) or 605.394.2416. Additionally, students may access the [online form](https://sdsmt-advocate.symplicity.com/public_report/index.php/pid390522?) to submit their complaint, appeal, or grievance.

## Grade Appeal Policy

In alignment with [BOR Policy 2:9](https://www.sdbor.edu/policy/documents/2-9.pdf), students who wish to appeal their final course grade shall first discuss the matter with the course instructor. If the concerns are unresolved following that discussion, students may utilize the [online form](https://sdsmt-advocate.symplicity.com/public_report/index.php/pid844003?) to submit “Appeal – Academic” for a “Grade Dispute”.

## Opportunity for All - Student Success Services and Support

Students are provided a one-stop source for information regarding all the services and supports to ensure success. Visit the [Opportunity for All](https://www.sdsmt.edu/Opportunity-For-All/) page to access service and department information including ADA accommodations, Career Services, Counseling, Office for Inclusion, Slide Rule (math support), Student Success, Title IX, Tutoring, and Veterans Services, to name a few.

## Personal ADA statement

I have heightened sensitivities to a broad spectrum of perfumes and have chemical sensitivities that can cause serious health issues for me. If amounts beyond my tolerance occur, there may be a discussion on finding an acceptable solution and may include seating chart changes, Zoom office hours, etc.  Therefore, I request your consideration to **limit the use of any personal products that have a scent** which will create an accessible space for everyone.

I request your consideration to be at the old etiquette rule of your chosen scent not being detectable more than an arm’s length away or ~2ft, and less in crowded environments.

Please reach out if you have any questions.

## South Dakota Board of Regents Required Syllabus Statements

The following statements may be found online in South Dakota Board of Regents Academic Affairs Council Guideline [5.3.A](https://www.sdbor.edu/administrative-offices/academics/academic-affairs-guidelines/Documents/5_Guidelines/5_3A_Guideline.pdf):

* Freedom in Learning
* Americans with Disabilities Act
* Academic Dishonesty and Misconduct
* Acceptable Use of Technology
* Emergency Alert Communications

# Additional Course Policies

## Electronic Devices Policy:

When attending class, you will have all electronic devices (including phones) turned off. You may not have earbuds or other listening devices in use. Laptops should be muted. If you disrupt the class with your phone ringing, text message notification, streaming your favorite tv show, or other electronic noises then you will be penalized 10 points from your “Small tasks section”. When using a laptop in class, you will be required to have your screen flat on your desktop. If the laptop can enter tablet mode, please do so.

**Tentative Course Schedule**

The following is intended to be an *approximate* guide to the topics we will cover and the amount of time that will be devoted to each topic. The topics or the time on each may vary slightly to accommodate the class. ***The dues dates and quiz dates are TENTATIVE***.

Color coding:

Black is a language topic.

Grey is a holiday.

Underlined purple is a theory topic.

Green, italic is an OOP topic.

Red, bold is an assignment.

**Week 1 (Aug 21)** Intro week assignments

M: Course introduction | Introduction to formal PL

W: What is a PL | PL history

R: Intro to Java (IntelliJ, basics)

F: Java (functions, exceptions, files)

**Week 2 (Aug 28)** Java Basic released

M: Java (OOP)

W: Java (OOP cont.) | Java (More data types)

R: Java specialties or over flow

F: OOP | Exceptions

**Week 3 (Sept 4)**

M: Labor Day, no class

W: Intro to OOP Patterns

R: Intro to OOP decomposition

F: Intro to OOP diagramming

**Week 4 (Sep 11)** Java Basic due | Java OOP released | Semester Project release

M: Visitor pattern

W: Visitor pattern cont.

R: In-class Assignment diagramming

F: M–day Semester Project Team Time | Q and A

**Week 5 (Sep 18)**

M: Major components of PL

W:Syntax | Parsing

R: Quiz 1

F: Binding

**Week 6 (Sep 25)** Java OOP due

M: Python (PyCharm, paradigms, basics)

W: Python (control)

R: Python (functions, exceptions, files)

F: Python (functions, exceptions, files)

**Week 7 (Oct 2)** Semester Project language selection due

M: Python (classes/OOP)

W:Scope

R: Type systems

F: Type systems overflow

**Week 8 (Oct 9)** Python released

M: Native American Day, no class

W: Iterator/ strategy pattern

R: Iterator/ strategy pattern, cont.

F: In-class Assignment diagramming (full time)

**Week 9 (Oct 16)**

M: Regex (EBNF revisited) with Python

W: Python (specialties) or overflow

R: Quiz 2

F: Intro to Functional programming

**Week 10 (Oct 23)**

M: SCALA (IntelliJ plugin, paradigms, basics)

W: SCALA (control)

R: SCALA (functions)

F: SCALA (exceptions, files)

**Week 11 (Oct 30**) Python due | Scala Released

M: SCALA (classes/OOP)

W: Chain of responsibility / recursive decent parsing

R: Chain of responsibility / recursive decent parsing

F: In-class Assignment diagramming (full time)

**Week 12 (Nov 6)**

M: SCALA (more datatypes and OOP)

W: SCALA parallelization

R: Control flow

F: Veterans Day, no class

**Week 13 (Nov 13)**

M: Functions

W: Functions

R: Selected topics or Language specialties

F: Quiz 3

**Week 14 (Nov 20)**

M: Weird languages

W: Thanksgiving, no class

R: Thanksgiving, no class

F: Thanksgiving, no class

**Week 15 (Nov 27)** Scala due

M: Selected topics or Language specialties

W: Selected topics or Language specialties

R: wrap up

F: wrap up

**Week 16 (Dec 4)**

M: wrap up

W: No class day

**Final’s Week (Dec 6 – Dec 13)** Semester project due

TDB: Semester project presentations, viewing mandatory