

TU Berlin Winter University 2019
January 7th - January 31st
Course Syllabus: Programming in Java - Rand Kouatly

Week 1: January 7th - 13th

	7	8	9	10	11	12	13
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9:00 - 10:30		2. Variables and Data Types - I	3. Conditions and Operators	4. Loops-I	Programming exercises	Cultural Session	
11:00 - 12:30	Welcome breakfast and Introduction	2. Variables and Data Types -II	Programming exercises	4. Loops-II			
	Lunch						
14:00 - 16:00	1.Introduction to Programming	Programming exercises	Cultural Session	Programming exercises	Cultural Session		
16:30 - 19:00	Welcome Dinner						

Week 2: January 14th - 20th

	14	15	16	17	18	19	20
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9:00 - 10:30	5. Arrays - I	6. Functions and Modules -I	Programming exercises	7- Methods - I	No class	Cultural Session	
11:00 - 12:30	6. Arrays - II	6. Functions and Modules -II	Programming exercises	7. Methods - II			
14:00 - 16:00	Programming exercises	Programming exercises	Cultural Session	Programming exercises	Cultural Session		
16:30 - 19:00	Cultural Session						

Week 3: January 21st- 27th

	21	22	23	24	25	26	27
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9:00 - 10:30	8. Graphical User Interfaces	9. Inheritance in Java-I	10. Data Type	11. Sorting and Searching-I	No class	No cultural program, so that students can potentially travel by themselves	
11:00 - 12:30	Programming exercises	9. Inheritance in Java-II	Programming exercises	11. Sorting and Searching-II	No class		
14:00 - 16:00	Programming exercises	Programming exercises	Cultural Session	Programming exercises	Cultural Session		
16:30 - 19:00	Cultural Session		Cultural Session		Cultural Session		

Week 4: January 28th- January 31st

	28	29	30	31	1	2	3
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9:00 - 10:30	12. Input and Outputs - I	13. Case Study - I	14. Course recap - I	Exam review	Departure		
11:00 - 12:30	12. Input and Outputs - I	13. Case Study - II	14. Course recap - II	15. Literature and tools			
14:00 - 16:00	Programming exercises	13. Case Study - III	Exam				
16:30 - 19:00	Cultural Session			Farewell Party			

Course Detailed Syllabus

The course will cover the following:

- 1- Introduction to Java and Java Virtual Machine, and the important and history of Java.
- 2- Installing and Work with Java platform on Linux and on Windows OS.
- 3- Prime data types, definition and usages, Beginning with simple Programs, then using String Integer, double, Boolean, some few I/O methods, How to create save and test and debug a program.
- 4- Simple Mathematics operations using mathematics modules, with practical examples, using Random numbers generator.
- 5- Definition of program flow control, how to control the flow control, and Conditional operators.
- 6- If condition, If else, nested If, Switch statement and conditions, New Java Switch statement.
- 7- Definition of Loops, While loops, for loops, nested for loop, and do while loops,
- 8- Definition of Array, Single dimension array, Double dimension array, Multidimensional array.
- 9- Check the arrays and comparing the arras, array transponder, array multiplication.
- 10- Functions and static classes definition and using in Java,
- 11- Passing arguments to static class, return values from static classes, local and global variable,
- 12- Mathematics and practical examples, programing games using random number generator.
- 13- Modules and Java Library definition, creating statistic Library, Random numbers generator library (Uniform, Normal, Gaussian, ...).
- 14- Recursion and examples using recursions.
- 15- Object in java and Object oriented programming.
- 16- Module definition and overloading.
- 17- Inheritance and Classes and Objects definitions, create classes and use them in the test program, examples on Arrays checks, prime numbers, graphs, adjacency matrix.
- 18- Constructors and passing arguments using to constructor
- 19- Encapsulation and data hiding.
- 20- Inheritance in java and level of inheritance using examples.
- 21- The definition of "this" and the public and local variables.
- 22- Creating User Data types with examples on using complex number and other examples,
- 23- String manipulation, introduction to string methods, with examples on how to change small to capital letter, search string, comparing strings, ...
- 24- Using graphics, printing lines, drawing objects, input and output to files, and read image, or voice files.
- 25- Polymorphism and Abstraction in Java using examples.
- 26- Accesses modifier in Java using examples, super keyword in Java.
- 27- Interface in Java using examples.
- 28- Input and output, save and read from files,
- 29- Creating moving items, mouse and keyboard control, play wave sound,
- 30- Swing library and GUI, adding GUI complement and creating events,
- 31- Sorting (Bubble sort, selection sort, insertion sort,...) searching problem using binary search,..
- 32- Generic, Generic methods, bounded parameters,
- 33- Short introduction on data lists, and List, Array list, hash Table

All topics will covered by more than 200 examples. The students will be write most of these examples in class with help of instructor.

Assessment information for students

Each student has to present one of his/her solutions to the programming exercises to the class each session.

The exam on January the 30th will be short answer questions and multiple choice questions. Half of the total points available in the exam have to be achieved in order to pass the exam.

Reading list

Week 1

Sivarama P. Dandamudi, "Fundamentals of Computer Organization and Design", Springer-Verlag, New York Inc. (25 April 2013) – Chapter 1 and 2.

Robert Sedgewick and Kevin Wayne, "Introduction to Programming in Java: An Interdisciplinary Approach", Princeton University, Aug - 2007. Chapter 1

Week 2

Robert Sedgewick and Kevin Wayne, "Introduction to Programming in Java: An Interdisciplinary Approach", Princeton University, Aug - 2007. Chapter 1 and 2

Week 3

David Etheridge, "Java: Graphical User Interfaces - An Introduction to Java Programming" Book Boon 2009, Chapter 3.

Robert Sedgewick and Kevin Wayne, "Introduction to Programming in Java: An Interdisciplinary Approach", Princeton University, Aug - 2007. Chapter 3

Week 4

Robert Sedgewick and Kevin Wayne, "Introduction to Programming in Java: An Interdisciplinary Approach", Princeton University, Aug - 2007. Chapter 2 and 4