



**UNIVERSITY OF SPLIT**  
UNIVERSITAS STUDIORUM SPALATENSIS  
**SPLIT SUMMER SCHOOL STSS2020**

**COURSE: SCIENTIFIC COMPUTING WITH JULIA 1.0**

Contact person: Professor Ivan Slapničar [ivan.slapnicar@fesb.hr](mailto:ivan.slapnicar@fesb.hr)  
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**Main topics:**

Julia is the most recent step in evolution of programming languages for high performance computing. Julia is fast, easy to use and open source. Julia has amazing ecosystems for data science, machine learning, scientific computing, parallel computing and visualization. It can also be used through JuliaBox without any installation. Julia has more than 3M users and over 20k github stars. In the course we will cover many methods of scientific computing, ranging from elementary numerical methods to advanced applications in data mining, compressed sensing, and image and signal processing. The course will be hands-on, and students will have an opportunity to solve problems of their choice.



**Program structure:**

- 5-day course
- Students will make their final presentations
- Lecture notebooks will be publicly available

**Important dates:**

Course dates: August 31 - September 4, 2020  
Deadline for application: August 1, 2020  
Payment due by: August 24, 2020  
Confirmation of the course: August 15, 2020

Price of the course: 300 € (tax included)

**Programme plan:**

- Day 1
- Introduction to Julia: installing and using Julia, using JuliaBox, programming for speed, working with packages, plotting, multi-threading. (3h)
  - Individual work/exercise (1h)
- Day 2
- Numerical methods: interpolation, approximation, least squares method, non-linear equations and optimization, numerical integration and differentiation. (3h)
  - Individual work/exercise (1h)
- Day 3
- Advanced applications: data compression, clustering, spectral clustering, principal component analysis. (3h)
  - Individual work/exercise (1h)
- Day 4
- Advanced applications: matrix splittings, signal decomposition, compressed sensing, recommendation engine. (3h)
  - Individual work/exercise (1h)
- Day 5
- Students' final projects (3h)
  - Final presentations (1h)

**Lecturer:**

Professor Ivan Slapničar  
University of Split, Faculty of Electrical Engineering,  
Mechanical Engineering, and Naval Architecture, Split  
Croatia