<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">Fourier Analysis and Applications</td></tr>
<tr><td>Code</td><td>PMM820</td><td>Year of study</td><td colspan="3">3 PD, V. semester</td></tr>
<tr><td>Course teacher</td><td>Prof.dr.sc. Saša Krešić-Jurić</td><td>Credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="3">20</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To introduce students to the fundamentals of Fourier series, Fourier transform and applications to signal processing.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">The student must have passed the following courses: Introduction to mathematical analysis, Mathematical analysis I and Linear algebra.
The student must have taken the course Mathematical analysis II.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Knowledge of the fundamentals of Fourier series, computation of Fourier series and identifying different types of convergence of the series.
Knowledge of basic properties of the Fourier transform and its applications to signal filtering and sampling.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Inner product spaces: inner product, Cauchy-Schwartz inequality, orthonormal systems, convergence in the norm, basis, Bessel's inequality, Parseval's relation.
2. Fourier series: definition and computation of Fourier series, Fourier series of even and odd functions, complex Fourier series, pointwise convergence and Dirichlet's theorem, uniform converence, convergence in the mean.
3. Fourier transform: Fourier transform in L^1(R), basic properties of the Fourier transform, Riemann-Lebesgue lemma, convolution theorem, Fourier transform in L^2(R), Plancharel identity, inverse Fourier transform.
4. Applications to signal processing: linear filters, time-invariant filters, causal filters, low-pass filters, Shannon-Whittaker sampling theorem, uncertainty principle.</td></tr>
<tr><td>Format of instruction</td><td colspan="5">Lectures and tutorial sessions.</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Class attendance and taking partial and final exams.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td colspan="5">Class attendance 2 ECTS
Partial exams 1 ECTS
Written exams 1 ECTS
Oral Exams 1 ECTS</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="5">Partial exams, written exam and oral exam.</td></tr>
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Required literature (available in the library and via other media)	A.Pinkus, S.Zafrani, Fourier Series and Integral Transforms, Cambridge University Press, Cambridge, 1997.
Optional literature (at the time of submission of study programme proposal)	P. Bremaud, Mathematical Principles of Signal Processing: Fourier and Wavelet Analysis, Springer, New York, 2002
Quality assurance methods that ensure the acquisition of exit competences	Student evaluations following completion of the course. The evaluations are administered according to the regulations of the University of Split.
Other (as the proposer wishes to add)	