Study programme	Level of study (cycle)	Third cycle – doctoral studies
	Study programme title	Doctoral programme in mathematical and computer sciences

COURSE

Course title	**Time-scale calculus and special functions**

Course code	Semester	Course status	ECTS credits	Contact hours
PMAT 602	II		10	30

Course aims and learning outcomes

The course aims to enable students to:

- understand the basic concepts of time-scale calculus, including delta and nabla differentiation and integration;
- master methods for solving linear and nonlinear dynamic equations on time scales;
- understand how classical special functions are generalised to discrete and hybrid domains;
- analyse the connections between special functions, spectral theory and evolution equations;
- develop the ability to conduct independent research in time scales, difference equations and special functions.

Course content

- Introduction to time-scale calculus
- Delta and nabla differentiation
- Integration on time scales
- Linear dynamic equations
- Special functions on time scales
- Discrete special functions
- Bessel functions and discrete analogues
- Applications to difference and evolution equations

REFERENCES

[1] Martin Bohner, Allan Peterson, Dynamic Equations on Time Scales: An Introduction with Applications, Birkhäuser, Boston, 2001.

[2] Martin Bohner, Allan Peterson, eds., Advances in Dynamic Equations on Time Scales, Birkhäuser, Boston, 2003.

[3] George E. Andrews, Richard Askey, Ranjan Roy, Special Functions, Cambridge University Press, Cambridge, 1999.

[4] Thomas J. Cuchta, Discrete Analogues of Some Classical Special Functions, Doctoral Dissertation, Missouri University of Science and Technology, 2015.

ASSESSMENT AND GRADING

	Criterion	Points	Pass mark
1.	Assignments		
2.	Project		
3	Final examination		
	Total	100	55