

	Course name: MATH 530 Introduction to Scientific Computing II					Department: Mathematics		Semester 2
	Methods of Education							Credit (ECTS)
	Lecture	Recitation/ (Etud)	Lab	Project/Field Study	Homework	Other	Total	8
	42	0	0	48	60	90	240	
Language	English							
Compulsory/Elective	Departmental Elective							
Prerequisites	Linear Algebra, Differential Equations. Good knowledge of ODE. Numerical Analysis I-II are offered.							
Course Description	Interpolation and Polynomial Approximation, Numerical Differentiation and Integration							
Course Contents	Weeks	Subjects						
	1	Introduction, Introduction to Interpolation						
	2	Polynomial Approximation, Lagrange Interpolation						
	3	Data Approximation and Neville's Method						
	4	Divided Differences						
	5	Piecewise polynomial approximation, cubic spline interpolation						
	6	Numerical Differentiation						
	7	Numerical Differentiation						
	8	Numerical Integration						
	9	Numerical Integration						
	10	Numerical integration						
	11	Introduction for derivations and applications using interpolation, numerical differentiation and integration for numerical solution of ordinary differential equations (ODEs)						
	12	Introduction for derivations and applications using interpolation, numerical differentiation and integration for numerical solution of ODEs						
	13	Introduction for derivations and applications using interpolation, numerical differentiation and integration for numerical solution of partial differential equations(PDEs)						
	14	Introduction for derivations and applications using interpolation, numerical differentiation and integration for numerical solution of PDEs						
Course Objectives	The graduate course offer students an opportunity to deepen the up-to-date knowledge in scientific computing. It introduces techniques for problem solving and algorithm development.							
Learning Outcomes and Competences	<p>Students who successfully complete the course will be able to:</p> <ul style="list-style-type: none"> • explore properties for numerical methods and mathematical models by using the analysis methods covered in the course • evaluate the properties in algorithms and mathematical models • choose solution methods for the solution of some benchmark problems in science and engineering • discuss the suitability and efficiency of the solution techniques covered in the course 							

	<ul style="list-style-type: none"> construct solution algorithms for computational purposes 			
Textbook and /or References	<p>References:</p> <ul style="list-style-type: none"> Burden R. L., Faires J. D. (2011) Numerical Analysis, Brooks/Cole Cengage Learning, Ninth Edition, Boston. Strikwerda, John. C. (2004) Finite Difference Schemes and Partial Differential Equations, SIAM. Chapra, Steven C. (2012) Applied numerical methods with MATLAB for engineers and scientists. McGraw-Hill Higher Education, Boston. Ross, S. L. (1984), Differential Equations, Wiley India. Rao, G. S. (2003). Numerical Analysis. New Age International Publishers. Boyce, W. E., DiPrima, R. C. (2009), Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India. Coddington, E. A. (2001), An Introduction to Ordinary Differential Equations, Prentice-Hall. 			
Assessment Methods and Criteria	In-Term Studies	Quantity	Percentage%	
	Mid-terms	1	30	
	Quizes	0	0	
	Assignment	4	20	
	Attendance	0	0	
	Practice	0	0	
	Project	1	0	
	Final Examination	1	50	
Total	7	100		
ECTS Allocated Based on Student Workload	Activities	Quantity	Duration	Total Work Load
	Course Duration	14	3	42
	Hours for off-the-c.r.study	14	5	70
	Assignments	4	20	80
	Mid-terms	1	10	10
	Project	1	20	20
	Final Examination	1	18	18
Total	35	72	240	
Instructors				