INTERNATIONAL UNIVERSITY OF SARAJEVO
FACULTY OF ENGINEERING AND NATURAL SCIENCES
MATH 205 - Numerical Analysis
AY 2018-2019

Course Code	Course Title		Weekly Hours T	A	L	ECTS	Weekly Class Schedule
MATH205	Numerical Analysis		3	1	1	6	Monday 16.00 - 16.50, Wednesday 14.00 - 15.50
Prerequisite	MATH 201	**It is a prerequisite to**					
Lecturer	Emir Karamehmedovic	**Office Hours Schedule**	Monday 11.00-12.00, Tuesday 10.00-12.00				
E-mail	ekaramehmedovic@ius.edu.ba						
Phone	033 957 207	**Office / Room No**	AF1.16				
Assistant	Tarik Hrnjic						
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Course Objectives	To teach the student to pose and solve numerically an engineering problem using numerical methods and tools.
Textbook	Applied Numerical Methods with Matlab for Engineers, Steven C. Chapra, 3rd Ed. McGraw Hill

Learning Outcomes	**After successful completion of the course, the student will be able to:**
1	Find roots of functions by using a range of methods,
2	Solve systems of linear and non-linear algebraic equations by using a range of methods,
3	Apply numerical interpolation, approximation, integration and differentiation in solving engineering problems,
4	Use techniques for solving ordinary differential equations,
5	Use MATLAB or other numerical tools for solving problems by numerical methods.

Teaching Methods	Class discussions with examples, active tutorial sessions for engaged learning and continuous feedback on progress. Team projects that involve engineering problems, interpretation and reporting.

WEEK	TOPIC	REFERENCE
Week 1	Errors - truncation and roundoff error, Matlab introduction	4.1 - 4.4
Week 2	Roots - Bisection Method, Secant Methods, False position	5.1 - 5.5
Week 3	Newton's Method, Secant Method, multivariable functions	6.1 - 6.3, 6.5
Week 4	Optimization: Golden section, parabolic interpolation,	7.1 - 7.3
Week 5	Linear systems - Gauss and Gauss-Seidel, **HW1**	9.1, 12.1
Week 6	Introduction to Interpolation, extrapolation and approximation,	15.1 - 15.5
Week 7	Curve fitting - Polynomial Interpolation, Least-Squares Approximation, **HW2**	16.1
Week 8	**MIDTERM EXAM**	
Week 9	Polynomial and sinusoidal curve fitting,	15.2, 15.3, 16.1
Week 10	Polynomial Interpolation	17.1 - 17.5
Week 11	Piecewise Interpolation,	18.1 - 18.5
Week 12	Numerical integration, Trapezoid Rule, Simpson's Rule	19.1 - 19.4 (not 19.4.3), 20.4
Week 13	First and Second Derivatives, Partial Derivatives, Richardson Interpolation,**HW3**	21.1 - 21.3, 21.7
Week 14	ODEs, Euler's Method, Runge-Kutta Methods, **Q1**	22.1 - 22.5
Week 15	Repetition / guest lecture on special topic in applied numerical analysis.	--

Assessment Methods and Criteria	**Evaluation Tool**	**Quantity**	**Weight**	**Alignment with LOs**
	Final Exam	**1**	**40**	
	Semester Evaluation Components		**60**	
	Homeworks	**3**	**30**	
	Quiz	**1**	**5**	
	Midterm exam	**1**	**25**	

*** ECTS Credit Calculation ***

Activity	Hours	Weeks	Student Workload Hours	Activity	Hours	Weeks	Student Workload Hours
Lecture hours	3	13	39	In-term exam study	8	1	8
Assignments	10	3	30	Final exam study	16	1	16
Active tutorials	2	9	18				
Home study	3	13	39	**Total Workload Hours =**			150
				ECTS Credit =			6

Course Academic Quality Assurance: Semester Student Survey Date: 24/9/2018