	Course name: MATH 312 Numerical Analysis II				Department: Mathematics			Semester 6
	Methods of Education							Credit (ECTS)
	Lecture	Recitation/ (Etud)	Lab	Exams	Homework/ Quiz	Other	Total	6
	42	0	0	36	40	62	180	

Language	English
Compulsory/Elective	Compulsory
Prerequisites	MATH 311

Course Contents

Weeks	Subjects
1	Approximating functions: polynomial interpolation
2	Approximating functions: polynomial interpolation
3	Hermite interpolation, spline interpolation, the B-splines
4	Hermite interpolation, spline interpolation, the B-splines
5	Taylor series expansions , divided differences
6	Taylor series expansions , divided differences
7	Least square approximation
8	Least square approximation
9	Numerical differentiation , numerical integration
10	Numerical differentiation, numerical integration
11	Numerical differentiation and integration
12	Richardson extrapolation
13	Gaussian quadrature, Romberg integration
14	Overview of adaptive quadrature, Bernoulli polynomials and Euler-Maclaurin formula

Course Objectives

This course aims to introduce students to the basics of approximating methods, numerical differentiation and numerical integration.

Learning Outcomes and Competences

By the end of this course, a student will be able to:

1. learn numerical approximation techniques
2. numerically differentiate
3. numerically integrate
4. evaluate complicated integrals
5. estimate the solutions to ordinary differential equations to any required accuracy

Textbook and /or References

1. Richard L. Burden and J. Douglas Faires, Numerical Analysis, 2011, 9th Edition, (available in AYBU library on the shelve QA297 B84 2011)
2. E. Ward Cheney, David R. Kincaid, Numerical Mathematics and Computing,1999, Brooks/Cole Publishing Company, 4th Edition.
3. G.M.Philips, P.J. Taylor, Theory and Applications of Numerical Analysis, 1996, Elsevier, 2nd edition.
4. L.N. Trefethen and D. Bau, Numerical Linear Algebra, Society of Industrial and Applied Mathematics

Assessment Methods and Criteria	In-Term Studies		Quantity	Percentage%
	Mid-terms		1	30
	Quizes		0	0
	Assignments		4	20
	Attendance		0	0
	Practice		0	0
	Project		0	0
	Final Examination		1	50
	Total		6	100
ECTS Allocated Based on Student Workload	Activities	Quantity	Duration	Total Work Load
	Course Duration	14	4	56
	Hours for off-the-c.r.study	14	4	56
	Assignments	4	8	32
	Mid-terms	1	12	12
	Project	0	0	0
	Final Examination	1	24	24
	Total	34	52	180
Instructors				