1. Course: ENCP 201 - Introduction to Applied Numerical Methods
2. Credits and Contact Hours: 3 credits, 3 lecture hours per week
3. Instructor: Varies
4. Example Textbook: Applied Numerical Methods with MATLAB for Engineers and Scientists, 5th ed., S. Chapra, 2023, McGraw. 9781264162604
5. Course Information
	1. Catalog Description: Introduction and application of linear algebra and numerical methods to the solution of physical and engineering problems. Techniques include iterative solution techniques, methods of solving systems of equations, and numerical integration and differentiation.
	2. Prerequisites: MATH 141. Corequisite: MATH 142.
	3. Substitute for ECIV 201 or EMCH 201
6. Course Goals
7. Learning Outcomes. Students will be able to:
	* 1. apply methods of numerical analysis to engineering problems.
		2. solve engineering problems using elementary linear algebra.
		3. implement numerical methods using technological platforms, such as programming languages, integrated development environment, software packages
8. Learning Outcomes (LOs) relation to ABET EAC Criterion 3 Student Outcomes

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| --- | --- | --- | --- |
| ABET EAC Criterion 3 Student Outcomes | LO1 | LO2 | L03 |
| an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. | X | X  | X  |

1. Topics Covered
	* Mathematical modelling concepts
	* Programming fundamentals, structures, functions
	* Numerics, roundoff and truncation errors
	* Roots and optimization
	* Linear algebra and matrices
	* Gauss elimination
	* LU factorization and eEigenvalues
	* Linear regression
	* Least squares and non-linear regression
	* Polynomial interpretation, splines and piecewise
	* Numerical integration and differentiation
	* Initial value problems
	* Boundary value problems
2. Document History

Created April 5, 2022