Discipline code: **FA115** Class: **A**

Discipline name: **INTRODUCTION TO THE FINITE ELEMENT METHOD**

TABLE A – DISCIPLINE VECTORS	
Number of Course Credits: 2	**Total Hours of Theoretical Activities:** 15 **Total Hours of Practical Activities:** 0 **Total Lab Hours:** 15

TABLE B - DISTRIBUTION OF THE DIDACTIC LOAD CONSIDERING THE VECTOR OF THE DISCIPLINE		**TOTAL IN HOURS** The total number of hours should be calculated considering the specific vectors of the discipline			
Type of Participation	**Name of Faculty Member**	**THEORETICAL**	&	**PRACTICE**	**Total (hours)**
Coordinator	**WILLIAM MARTINS VICENTE**	**15**		**15**	**30**

SYLLABUS:

Review of solid mechanics. Bar and truss elements. Elements of beams and frames. Two-dimensional elements. Three-dimensional elements. Introduction to ANSYS software. Modeling and solution techniques.

SCHEDULE:

DATES	LESSON	LECTURE
01/08	1 – Presentation of the course Introduction to Finite Element Method	William M. Vicente
08/08	2 - Introduction to Finite Element Method – ANSYS Workbench	William M. Vicente
15/08	3 – Bars and Trusses	William M. Vicente
22/08	4 – Bars and Trusses – ANSYS Workbench	William M. Vicente
29/08	5 – Beams and Frames	William M. Vicente
05/09	6 – Beams and Frames – ANSYS Workbench	William M. Vicente
12/09	7 – Two–Dimensional Elasticity	William M. Vicente
19/09	8 – Two–Dimensional Elasticity – ANSYS Workbench	William M. Vicente
26/09	9 – Modeling and Solution Techniques	William M. Vicente
03/10	**There will be no class**	
10/10	10 – Modeling and Solution Techniques – ANSYS Workbench	William M. Vicente
17/10	11 – Plates and Shell Analyses	William M. Vicente
24/10	12 – Plates and Shell Analyses – ANSYS Workbench	William M. Vicente
31/10	13 – Three-Dimensional Elasticity	William M. Vicente
07/11	14 – Three-Dimensional Elasticity – ANSYS Workbench	William M. Vicente
15/11	**There will be no class**	
22/11	15 – Presentation of the project	William M. Vicente
12/12	Final exam	William M. Vicente

BIBLIOGRAPHY:

Main References

- Xiaolin Chen, Yijun Liu, Finite Element Modeling and Simulation with ANSYS Workbench, CRC Press, 2015.
- Nam-Ho Kim e Bhavani V. Sankar, Introdução à Análise e ao Projeto em Elementos Finitos, LTC, 2011.
- Marco Lúcio Bittencourt, Análise computacional de estruturas com aplicação do Método de Elementos Finitos, Ed. Unicamp, 2010.
- O. C. Zienkiewicz, R. L. Taylor, J. Z. Zhu, The Finite Element Method: Its Basis and Fundamentals, Butterworth-Heinemann; 7 ed., 2013.

Additional References:

- K. H. Huebner, et al, The Finite Element Method for Engineers, Wiley-Interscience, 2001.
- R. D. Cook, D. S. Malkus, M. E. Plesha, Concepts and Applications of Finite Element Analysis, John Wiley & Sons; 4 ed., 2001.
- Logan, D. L. A First Course in the Finite Element Method: Enhanced Edition, 6th Edition, Cengage Learning, 2022
- Jacob Fish, Ted Belytschko, A First Course in Finite Elements, Wiley, 2007.
- Klaus-Jürgen Bathe, Finite Element Procedures - Second Edition, 2014.

GRADES (Including dates of exams, assignments and projects)

Deadlines	REPORTS, LIST OF EXERCISES, ETC. / DESCRIPTION	Rate
	Assignments – N1	**0,6**
22/11	**Project – N2**	**0,4**
Grade (MP):		
Grade (Mp): Mp = N1*0.6 + N2*0.4 Minimum grade for direct course approval: 5.0		
FINAL GRADE (NF): NF = (Mp + E) / 2 Minimum grade for passing the course: 5.0		
OBSERVATIONS:	**Minimum attendance for approval in the discipline is 75%**	