NIRMA UNIVERSITY
Institute of Technology
School of Engineering
Bachelor of Technology - Civil Engineering
Open Electives (all branches except Mechanical Eng.)

L	T	P	C
3	0	0	3

Course Code	2CLOE04
Course Name	Finite Element Method

Course Outcomes:
At the end of the course, students will be able to –

1. demonstrate finite element formulation
2. analyze one dimensional engineering problems
3. solve two dimensional problems of engineering using finite element
4. utilize computer program for solving engineering problems.

Syllabus: Teaching hours: 45

Unit 1: Finite Element Formulation **Hours: 10**

Evolution of Finite Element Method (FEM), Applications, Equilibrium conditions, Constitutive law, Principle of discretization, Element field matrix formulation.

Unit 2: Application to Engineering Disciplines **Hours: 25**

Computation of element properties using generalised coordinators and natural coordinators for one dimensional & two dimensional elements, Field formulations for isoparametric elements, Numerical integration, Convergence.

Unit 3: Computer Applications **Hours: 10**

Pre-processing, Solution, Post-processing, Development of computer program, Use of FEA packages.

Self-Study:
The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings:

1. Logan, D. L. *A First Course in Finite Element Method*, Cengage Learning.
2. Desai, Y. M., Eldho, T. I. & Shah, A. H. *Finite Element Method with Applications in Engineering*, Pearson.
3. Cook, R. D., Malkus, D. S., Plesha, M. E., Witt, R. J. *Concept and Application of Finite Element Analysis*, Wiley.
4. Reddy, J. N. *An Introduction to the Finite Element Method*, McGraw Hill Education.
5. Zienkiewicz, O. C. & Taylor, R. L. *Finite Element Method: Its Basic and Fundamentals*, Elsevier India.

L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. academic year 2020-21 and onwards