CE(PC)597	**Computer Applications in Civil Engineering**	2P	1 Credits
Course Outcome	On successful completion of this course, student should be able to: **1.** Use the computer as a problem-solving tool. **2.** Identify and formulate Civil Engineering problems solvable by computers. **3.** Perform linear algebra and matrix operations and their application to solve Civil Engineering problems **4.** Solve sets of linear equations and determine roots and nonlinear equations		

	5. Construct, interpret and solve simple optimization problems **6.** Develop programs for Civil Engineering analysis and design problems. **7.** Use various software used in industries for analysis and design.
Prerequisite	ES-CS291 Programming for Problem Solving, CE(ES)392 Computer-aided Civil Engineering Drawing.
Module 1	**Introduction:** Concept of problem-solving using computer, use of programming language and software for problem solving; Identification of various design and analysis problems in different fields of Civil Engineering to be solved using computers; Procedure, formulae and data related to the analysis and design of such problems.
Module 2	**Use of spreadsheets:** Learning spreadsheets like MS Excel, matrix analysis, use of Goal Seek and Solver, Optimization Tools; Plotting. Applications to problems involving tabular data, CE estimation, surveying, and design problems.
Module 3	**Programming Languages:** Learning at least one language: Fortran 2003/2008/2018, C++11/C++14, Python 3, VBA 7.0; Computing platforms like Matlab/Scilab/MathCAD; Solving analysis and design problems in areas like surveying, hydraulics, structural analysis, RCC design, soil mechanics and foundation, transportation, water resources, etc.
Module 4	**Use of Software:** Familiarity with widely used Civil Engineering software like STAAD Pro, HEC-RAS, HEC-HMS, SWMM, Mx Roads, etc.; Solving at least two such analysis/design problems.