BASIC COMPUTATION LAB

(Elective - 1)

I Semester

Course Code: 19CE2156	L	P	C
	0	3	1.5

Course Outcomes:

At the end of the Course, the Student will be able to:

CO1 Learn the basics of programming and Machine precision

CO2 Plot the outputs

CO3 Perform regression & Interpolation for the given data

CO4 Apply programming to civil engineering problems

CO5 Compute load carrying capacity & stresses for structural problems

LIST OF EXERCISES:

1. **INTRODUCTION TO PROGRAMMING:** Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers, working with files: Scripts and Functions.
2. **PLOTTING:** Plotting tools for two dimensional and three dimensional plots, putting legends, texts, using subplot tool for multiple plots.
3. **REGRESSION AND INTERPOLATION**: Linear least squares regression (including lsqcurvefit function), Functional and nonlinear regression (including lsqnonlin function), polynomial regression, Interpolation using spline and pchip
4. Design of a Simply Supported under reinforced concrete beam
5. Calculation of BOD at time 't'
6. Design of horizontal curve of a highway
7. Design of extra widening at horizontal curve
8. Calculation of Stopping Sight Distance
9. Calculation of Overtaking Sight Distance on highway

10. Design of Super elevation of horizontal curve
11. Spot Speed Analysis of a road system
12. Find the CBR value from the given load-penetration data
13. Calculation of discharge of Venturimeter for the given data.
14. Calculation of deflection of a Cantilever beam
15. Stability analysis of a retaining wall
16. Find active and passive earth pressure from Rankine theory
17. Resultant stresses at extreme fibres in PSC beam
18. Calculation of pressure line in PSC beam
19. Find the loss of prestress
20. Find the load capacity of a welded bracket

References:

1. Chapra S.C. and Canale R.P. *Numerical Methods for Engineers*, 5th Edition, McGraw Hill, 2006.

2. Fausett L.V., *Applied Numerical Analysis Using MATLAB*, 2nd Edition, Pearson Education, 2007.

Web references:

1.NPTEL Video Courses: Computational Techniques-http://nptel.ac.in/courses/103106074

2.NPTEL Video Courses: Numerical Methods and Programming: http://nptel.ac.in/courses/122106033