

FS 2018-19

MAT1011(CFE) - ELA

**Assessment 1: Continuity, Differentiability and the Mean Value Theorem**

**Due-Date of Online Submission: 31.08.2018:**

**Guidelines for Submission:**

- First download this question-sheet
- Create a matlab file (phani.m, for instance), in which the first few lines should be as follows:
  - (a) Fall Semester 2018 - 19
  - (b) Course: MAT1011(CFE) - ELA
  - (c) Slot \_\_\_\_\_
  - (d) Assessment No. \_\_\_\_\_
  - (e) Regd. No. \_\_\_\_\_
  - (f) Name \_\_\_\_\_

Write the matlab programme or code in this file for each of the tasks given to you.

- Then generate the output. Scan the graphical output, also where ever required.
- Take the snap shot /Scan the m-file and the corresponding output file(s) neatly, which should be clearly visible.
- Make a **single pdf** file and upload it through the lab log-in portal.
- **Do not mail** the file to me.
- Follow the guidelines strictly. Any deviation from the above instructions will lead to the reduction in marks

*Uploading of file in any other format (image files, zipped files etc.) is not acceptable.*

**Exercise 1 (6 marks).** Develop and execute a matlab programme to verify the continuity and differentiability of each of the following functions  $f(x)$  at the indicated point  $a$ . Also, sketch the graph of  $f$  and the tangent of the differentiable curve  $y = f(x)$  at the point  $(a, f(a))$ :

- (a)  $f(x) = \sin^2 x + \cos^3 2x$  at  $a = \pi/2$
- (b)  $f(x) = 2|x - 1| - 3|x + 2|$  at  $a = 1, -2$
- (c)  $f(x) = x^2 + \frac{1}{5x+1}$  at  $a = -1/4$

**Exercise 2 (4 marks).** Find the constant of the mean value theorem for each of the following functions on the indicated interval:

- (a)  $f(x) = 1 + \sqrt{x}$  on  $[-1, 3]$
- (b)  $f(x) = \frac{x+1}{x-1}$  on  $[-2, -1]$
- (c)  $f(x) = x^4 - 2x^2$  on  $[-3, -3]$
- (d)  $f(x) = \log x$  on  $[1, e]$