

National University of Computer & Emerging Sciences MT220: Complex Variables and Transforms Section: A,B (Fall 2021)			A 04 [Total maks 60]
Instructor: Muhammad Usman Rashid TAs: Mustafa Amjad (i190807@nu.edu.pk) Subata Khan (i190842@nu.edu.pk)	Topic: Fourier series	Launch: Wed, Dec 01 '21	Submit Date: Sun, Dec 5 '21

CLO-06

Submit on GCR by Submit Date – Late Assignments not accepted		
Submitted by:	Roll #:	Section:
Check here: <input type="checkbox"/> I agree that there is ZERO Tolerance Policy for plagiarism and cheating in all assessments. First plagiarism case gets zero. Subsequent plagiarism cases get ZERO in all assignments. A gross violation may be reported to the Department Discipline Committee (DDC).		

Assignment Submission: **Terms & Conditions**

1. This is a graded assignment; students are advised to revise all concepts before attempting.
2. Submit a **single PDF** in **GCR** by the submit date mentioned in GCR; SLATE/email not accepted.
3. Any pics or images used in the PDF must be scanned with **ClearScanner** app.
4. **Do not use** CamScanner or MS Lens as it deteriorates the image quality and the writing at the back of the page is also visible.
5. Submitting individual pictures or attaching multiple files **not accepted**.
6. **Late submission not accepted**.
7. Be sure to fill and checkmark the agreement in the submission box. **If not filled or checked, submission not accepted**.

Assignment Collaboration: **Terms & Conditions**

1. Collaboration is permitted with limitations as defined below.
2. All collaboration to be strictly done on GCR -> Assignment Collaboration Channel. May not post/discuss on any other forum.
3. Permitted forms of collaboration include (but not limited to) asking questions, answering questions, explaining intent of the question, explaining concepts, highlighting methods, discussion of all types, etc.
4. Forbidden forms of collaboration include (but not limited to) uploading solutions or partial solutions, letting know the partial or final answers, etc.

This Channel will be monitored continuously. Anyone indulging in forbidden activities will be removed from the channel, their posts deleted, and zero marks assigned in the assignment.

Assignment Problem:

1. Find the Fourier series representation of the function with period equals to $1/50$ given by [10]

$$f(t) = \begin{cases} 1 & \text{if } 0 < t < 0.01 \\ 0 & \text{if } 0.01 < t < 0.02 \end{cases}.$$

2. Find the Fourier series representation of [10]

$$f(t) = 1 + t \quad \text{if } -\pi < t < \pi, \quad f(t + 2\pi) = f(t).$$

3. Find the Fourier series of the function with period 2π defined by [10]

$$f(t) = t^2 \quad \text{if } 0 < t < 2\pi.$$

4. By defining an appropriate extension of the function [10]

$$f(t) = t \quad \text{if } 0 < t < \pi, \quad f(t + 2\pi) = f(t).$$

Find the half-range cosine series representation and Fourier series.

5. Obtain the Fourier cosine series with period 2π for the function [10]

$$f(t) = \begin{cases} t & \text{if } 0 < t < \frac{\pi}{2} \\ \frac{\pi}{2} & \text{if } \frac{\pi}{2} < t < \pi \end{cases}.$$

6. Determine if the function is even, odd or neither. Hence obtain its Fourier series. [10]

$$f(t) = \begin{cases} \sin 2t & \text{if } -\pi < t < -\frac{\pi}{2} \\ 0 & \text{if } -\frac{\pi}{2} < t < \frac{\pi}{2} \\ \sin 2t & \text{if } \frac{\pi}{2} < t < \pi \end{cases}, \quad f(t + 2\pi) = f(t).$$