

**FIRST COURSE HANDOUT (FCH)**  
**(ANALYSIS - I, MTH 301)**  
**ODD SEMESTER 2025-26**

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**1. PREREQUISITE**

**MTH 101A or MTH 111M and MTH 112M.**

**2. OBJECTIVE**

The main objective of this course is to build a rigorous foundation in analysis and to strengthen students' ability to construct formal mathematical proofs. We are planning to cover the following topics:

- Real Number system: Completeness property, limit, continuity, Countable and Uncountable sets, Cantor set.
- Metric Space: Examples, open and closed sets, limit in metric spaces, convergence of sequences, continuity.
- Completeness: Complete metric space, Nested set theorem, Baire category theorem, Applications.
- Compactness: Totally bounded, Characterizations of compactness, Continuous functions on compact sets, Uniform continuity.
- Connectedness: Characterizations of connectedness, Continuous functions on connected sets, Path connected.
- Riemann integration: Definition and existence of integral, Fundamental theorem of calculus, Set of measure zero, Characterization of integrable functions.
- Convergence of sequence and series of functions: Pointwise and uniform convergence of functions, Series of functions, Power series, Dini's theorem, Ascoli's theorem, Weierstrass approximation theorem.

**3. REFERENCES**

- Class notes.
- Real Analysis. - *by N. L. Carothers.*
- Principles of Mathematical Analysis - *by W. Rudin.*
- Real Mathematical Analysis - *by C. C. Pugh.*

**4. MODE OF TEACHING**

The course will be taught in **offline mode**.

## 5. LECTURES, TUTORIAL TIME AND VENUE

**\*\*1st Lecture: Class on 31/07/2025 at L11 12:00-12:50\*\***

Usual Timing:

Class → **Monday, Wednesday, Friday - 12:00-12:50 at L11**

Tutorial → **Thursday - 12:00-12:50 at L10**

## 6. ASSIGNMENTS

Assignments will be given periodically and shared via email. Selected problems from the assignments will be discussed in subsequent tutorials. Students are strongly encouraged to attempt all assignment problems prior to the tutorial sessions.

## 7. ATTENDANCE POLICY

The attendance of each class and tutorial will be taken through the **Acadly** app (more information will be shared in the coming days). **Note that attendance data is purely for statistical record purposes and will NOT influence or contribute to the final course evaluation/grading.**

## 8. COURSE EVALUATION

There will be at-least 4 quizzes, which may include surprise quizzes, (it is advisable to follow the lecture material regularly), one Mid-Semester exam and one End-Semester Exam.

Tentative weightage (\*) of marks are as follow:

**Quiz** : approx- 30 percent weightage (Dates will be announced in advance in class and via email)

**Mid-Sem Exam**: approx- 25 percent weightage (Follow DOAA website and timeline)

**End-Sem Exam**: approx- 45 percent weightage (Follow DOAA website and timeline).

**\* Note that, weightage break up is only tentative, and will be tried to follow. For any changes, the students will be informed in advance.**

## 9. MAKE-UP EXAM

**There will be no alternative/ make up exam for missing quiz and mid-sem exam.** Make-up exam for the End-Sem exam is as per the institute policy.

If a student misses any quiz or mid-sem exam due to some bonafide reason, and **having leave approval from DOAA office**, his/her score in that examination may be prorated at the discretion of the instructor.

## 10. IMPORTANT NOTES

- **It is advisable to attend and follow all the lectures and assignments thoroughly and regularly.**
- Any **dishonest practice** during any of the exams will be reported to DOAA and appropriate action would be taken to penalize such action.
- **Any further decision and information will be shared via course alias (email).**
- If a student wants to meet for doubts, **send email for appointment in advance.**