

# Computational Études

A Spectral Approach

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## A Tentative Teaching Plan

### Course Information

**Course:** MATH 794 – 01 (CRN 21296)

**Semester:** Spring 2026

**Schedule:** Mon & Wed, 16:30 – 17:45

**Location:** G-G02013




### Instructor

**Name:** Dr. Denys Dutykh

**Department:** Mathematics

**Institution:** Khalifa University

**Location:** Abu Dhabi, UAE

**Legend:**  Completed  Current  Planned

Week	Dates	Monday Lecture	Wednesday Lecture
1	Jan 12–14	Course introduction Syllabus & overview	<b>Ch. 2:</b> Classical PDEs Heat equation – separation of variables
2	Jan 19–21	<b>Ch. 3:</b> Mise en bouche Method of weighted residuals, collocation example, collocation vs Galerkin	
3	Jan 26–28		
4	Feb 2–4		
5	Feb 9–11		
6	Feb 16–18		
7	Feb 23–25		
8	Mar 2–4		
9	Mar 9–11		
–	Mar 16–27	<i>Spring Break &amp; Eid Al Fitr – No classes</i>	
10	Mar 30–Apr 1		
11	Apr 6–8		
12	Apr 13–15		
13	Apr 20–22		
14	Apr 27–29		
–	May 4–14	<b>Final Examinations Period</b>	

Table 1: Teaching schedule for MATH 794 – Spring 2026

### Notes

- This schedule is tentative and may be adjusted based on class progress.
- Chapter numbers refer to *Computational Études: A Spectral Approach*.
- Office hours are available by appointment.
- All course materials are available in the course repository.

## Course Projects

### Project I: Spectral Methods for Boundary Value Problems

Assigned: Jan 19, 2026)

(Based on Chapter 3 –

Implement spectral methods (collocation and/or Galerkin) to solve a boundary value problem of your choice. Requirements:

1. Find a linear BVP of at least second order with **non-homogeneous** boundary conditions.
2. Construct an exact solution to this problem (or design the problem around a known exact solution).
3. Choose appropriate basis functions that satisfy the boundary conditions identically.
4. Apply the **Collocation** method, **Galerkin** method, or both to obtain a numerical solution.
5. Present results in a table that includes the error at the collocation points.
6. Provide graphical representations showing: the exact solution, the numerical approximation, and the difference (error) between them.

### Project II

*To be announced*

### Project III

*To be announced*

### Project IV

*To be announced*

*Last updated: January 20, 2026*