

## MATH 451-H04: Methods of Applied Mathematics II (Capstone II) *Spring 2020 Course Syllabus*

**NJIT Academic Integrity Code:** All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

### COURSE INFORMATION

**Course Description:** Small teams of students conduct research projects under the guidance of faculty members who perform applied research. Effective From: Spring 2009.

**Number of Credits:** 3

**Prerequisites:** Math 450H with a grade of C or better.

**Course-Section and Instructors**

Course-Section	Instructor
Math 451-H04	Professor W. Choi

**Office Hours for All Math Instructors:** [Spring 2020 Office Hours and Emails](#)

**Course Materials:**

- *Water Wave Mechanics for Engineers and Scientists* by R. G. Dean and R. A. Dalrymple
- *Spectral Methods in Matlab* by L. N. Trefethen

**University-wide Withdrawal Date:** The last day to withdraw with a W is **Monday, April 6, 2020**. It will be strictly enforced.

### POLICIES

**DMS Course Policies:** All DMS students must familiarize themselves with, and adhere to, the [Department of Mathematical Sciences Course Policies](#), in addition to official [university-wide policies](#). DMS takes these policies very seriously and enforces them strictly.

**Grading Policy:** The final grade in this course will be determined as follows:

Projects and Presentations	60%
Midterm Exam	15%
Final Report	25%

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**Attendance Policy:** Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the **Math Department's Attendance Policy**. This policy will be strictly enforced.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times.

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## ADDITIONAL RESOURCES

**Math Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G11 (See: **Spring 2020 Hours**)

**Further Assistance:** For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for **Instructor Office Hours and Emails**.

All students must familiarize themselves with and adhere to the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. The Department of Mathematical Sciences takes these policies very seriously and enforces them strictly.

**Accommodation of Disabilities:** Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at **973-596-5417** or via email at **lyles@njit.edu**. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

- <https://www.njit.edu/studentsuccess/accessibility/>

**Important Dates** (See: **Spring 2020 Academic Calendar, Registrar**)

Date	Day	Event
January 21, 2020	T	First Day of Classes
January 31, 2020	F	Last Day to Add/Drop Classes
March 15 - 22, 2020	Su-Su	Spring Recess: No Classes/ University Open
April 6, 2020	M	Last Day to Withdraw
April 10, 2020	F	Good Friday - University Closed
May 5, 2020	T	Friday Classes Meet - Last Day of Classes
May 6 & 7, 2020	W & R	Reading Days
May 8 - 14, 2020	F - R	Final Exam Period

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## PROJECTS

1. Generation and propagation of solitary waves
2. Generation and propagation of periodic waves
3. Interaction of solitary waves with topography
4. Standing waves in a rectangular box

Each project has theoretical/numerical/experimental components

## COURSE OUTLINE

Week 1-2: Finite difference approximation

Week 3-4: Fourier series and pseudo-spectral method

Week 5-6: Linear water waves

Week 7-8: Long wave models and solitary waves

Week 9-10: Laboratory experiments and midterm

Week 11: Perturbation method and nonlinear wave models

Week 12-13: Comparison between theoretical, numerical, and experimental results

Week 14: Preparation of final report

Week 15: Final presentations

*Updated by Professor W. Choi - 1/20/2020  
Department of Mathematical Sciences Course Syllabus, Spring 2020*

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