

**Faculty of Natural Sciences, Department of
Physics, Graduate Programme**

Title: Research Seminar (Charged fluids in the bulk and near charged interfaces)

Code: PHYS 6995-022

Number of Credits: 2

Number of Hours 3 hours of virtual lecture (**technology assisted remote lecturing/learning**) per week

Prerequisites: Permission of the Graduate Committee, permission of the Professor

Effective date of the syllabus First Semester, 2021-2022 academic year

Instructor Lutful Bari Bhuiyan

Office Location: Natural Sciences II, C-350

Class period: 3 hours per week by mutual arrangement/agreement

Office hours: Mondays and Wednesdays, 8 am – 1 pm, 2 pm – 3.30 pm

Fridays 8 am – 12 noon, 2 pm – 3.30 pm

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Course objective: The goal of the course is that the student becomes comfortable in handling a research topic, thinks critically and independently about it, and develops methodology towards its completion. The research is expected to contribute towards a thesis for a Master's or a Doctoral degree.

Course description: This purpose of the research seminar is to expose the student to the physics and chemistry of electrolytes near a charged interface (an electric double layer) based on methods of formal statistical mechanics and numerical simulation techniques. The student will learn to use formal integral equation theories and potential based approaches. They will also learn computational algorithms to obtain numerical results when such theories are applied to a particular physical situation. Proficiency in programming language(s) will be developed.

Prerequisites: The students require understanding of the core Physics curriculum, in particular, Statistical Mechanics, Electromagnetism, and Condensed Matter. Quantum Mechanics and Condensed Matter Physics. Knowledge of computer programming will be useful.

Bibliography:

- Published research papers relevant to the project.
- *Statistical Mechanics* by Donald A. McQuarrie, University Science Books, 2000, ISBN 978 1891389153.
- *Introduction to Electrodynamics* by David J. Griffiths, 4th edition, Pearson 2013, ISBN 10.0-321-85656-2.

Instructional Strategy: This being a research course, research is performed by the student throughout the year under the supervision of the advisor. The student is encouraged to work independently.

Grading: The grading will be based on the student's commitment to the research topic and the progress achieved progress. The grading system (letter grade) is PS, PN, PB, NP.

Facilities and resources required: Access to research journals through the UPR library system (<http://biblioteca.uprrp.edu/>). Computing resources are through the computers available to the Advisor.

Class schedule:

Week	Topics
1-15	The research project is chosen as per the student's interest and agreement of the Advisor. The student performs the research throughout the year.
	The student meets with the Advisor from time to time to apprise them of the progress in research, or difficulties encountered, and to seek advice and guidance.

Rights of Students with Disabilities

UPR complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act 1990 (ADA) and the Commonwealth of Puerto Rico Law 51. Students receiving services through Rehabilitaci3n Vocacional must contact the professor at the beginning of the semester in order to plan for a reasonable accommodation and any required support equipment according to the recommendations given by the Oficina de Asuntos para las Personas con Impedimentos (OAPI) of the Dean of Students. Likewise, students with special needs that require some type of accommodation must contact the professor.

Acomodo Razonable

La Universidad de Puerto Rico cumple con todas las leyes federales, estatales y reglamentos concernientes a discriminación, incluyendo "The American Disabilities Act" (Ley ADA) y la Ley 51 del Estado Libre Asociado de Puerto Rico. Los estudiantes que reciban servicios de rehabilitación vocacional deben comunicarse con el (la) profesor(a) al principio del semestre para planificar el acomodo razonable y equipo de apoyo necesario conforme a las recomendaciones de la Oficina de Asuntos para las Personas con Impedimento (OAPI) del Decanato de Estudiantes. Una solicitud de acomodo razonable no exime al estudiante de cumplir con los requisitos académicos del curso.

Academic Integrity

La Universidad de Puerto Rico promueve los más altos estándares de Integridad académica y científica. El Artículo 6.2 del Reglamento General de estudiantes de la UPR (Certificación Núm. 13, 2009-2010, de la Junta de Síndicos) establece que “la deshonestidad académica incluye, pero no se limita a: acciones fraudulentas, la obtención de notas o grados académicos valiéndose de falsas o fraudulentas simulaciones, copiar total o parcialmente la labor académica de otra persona, plagiar total o parcialmente el trabajo de otra persona copiar total o parcialmente las respuestas de otra persona o las preguntas de un examen, haciendo o consiguiendo que otra tome en su nombre cualquier prueba o examen oral o escrito, así como la ayuda o facilitación para que otra persona incurra en la referida conducta”. Cualquiera de estas acciones estará sujeta a sanciones disciplinarias en conformidad con el procedimiento disciplinario establecido en el Reglamento general de Estudiantes de la UPR vigente.

Hostigamiento

La Universidad de Puerto Rico prohíbe el discrimen por razón de sexo y género en todas sus modalidades, incluyendo el hostigamiento sexual. Según la Política institucional contra el Hostigamiento Sexual en la Universidad de Puerto Rico, Certificación Núm. 130, 2014-2015 de la Junta de Gobierno, si un estudiante está siendo o fue afectado por conductas relacionadas a hostigamiento sexual, puede acudir ante la Oficina de la Procuraduría Estudiantil, el Decanato de Estudiantes o la Coordinadora de Cumplimiento con Título IX para orientación y/o presentar una queja.