Physics 782 Soft Condensed Matter Physics Spring 2017

This syllabus was last updated on **January 04, 2017**

Instructor: Sylvio May, South Engineering 216A
phone: 701.231.7048, email: Sylvio.May@ndsu.edu,
web: https://www.ndsu.edu/faculty/symay/

Bulletin Description: An introduction to soft condensed matter, focusing on colloids, polymers, liquid crystals, surfactants, and biological systems. Topics will include characterization of soft materials, interparticle interactions, structure, equilibrium phase behavior, non-equilibrium properties, and practical applications.

Goals: The course develops a graduate-level understanding of the properties, behaviors, and theoretical methods to describe soft matter systems.

Objectives: This course will

1. enable students to understand the specificities of various soft materials such as colloidal solutions, liquid crystals, polymers, surfactants, gels, and biomaterials,
2. equip students with the theoretical tools needed to carry out research in soft condensed matter physics,
3. provide extensive practice in solving soft condensed matter physics problems in different contexts and for different levels of complexity,
4. offer opportunities to read scientific articles and discuss (or reproduce) their findings.

Course objectives are met by readings, lectures, in-class discussions, and homework through the development of a quantitative understanding on the level of graduate students. Students demonstrate their level of comprehension in homework, exams, and a presentation.

Prerequisites: Phys463/663 or consent of instructor

Meetings: Tuesday and Thursday 3:30-4:45pm in *South Engineering, Rm 221*
According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf) class attendance is expected but is not a component of the course grade.

Office hours: 10:30-11:45 a.m. Wednesday and Friday, or by arrangement

Textbook: R.A.L. Jones, *Soft Condensed Matter*, (2002, Oxford University Press)

Topic Outline and Timing: The subjects and corresponding textbook chapters are listed below, along with the tentative exam dates. Textbook chapters only provide a rough orientation to the material that will be covered.

Chapters 1-3: Introduction, Phase transitions
Exam 1: Thursday, February 02
Chapter 4: Colloids
Exam 2: Thursday, February 23
Chapter 5-8: Polymers, Liquid Crystals
Exam 3: Thursday, March 23
Chapter 9: Self-assembly
Exam 4: Thursday, April 13
Chapter 10: Applications
Final Exam: Thursday, May 11 (3:15am – 5:15am)

No lectures on 03/14/17 and 03/16/17 because of Spring break

Format: The class will involve traditional lecture, along with discussion and problem solving. Students will be asked to engage in in-class discussions and ask questions at any time during or after class.

How to succeed: Attending class, reviewing lecture notes, reading the textbook and additional material provided by the instructor, taking part in class activities and discussions, and completing homework are keys to success. Every student is encouraged to contact the instructor with any concerns, questions, and suggestions.

Homework: Homework will be assigned according to the following table

Set	Assignment Date	Due Date	Points (max)
1	01/10/17	01/24/17	10
2	01/24/17	02/07/17	10
3	02/07/17	02/21/17	10
4	02/21/17	03/07/17	10
5	03/07/17	03/28/17	10
6	03/28/17	04/11/17	10
7	04/11/17	04/25/17	10
8	04/25/17	05/04/17	10

Written homework should be handed in on the due date before the begin of class. Each set yields a maximum of 10 points. The instructor grades and returns each homework set no later than two weeks after the due date.

Exams: Schedule for the 5 exams:

Day	Time		Chapters	Points (max)
02/02/17	3:30-4:45 pm	Exam 1	1-3	20
02/23/17	3:30-4:45 pm	Exam 2	4	20
03/23/17	3:30-4:45 pm	Exam 3	5-8	20
04/13/17	3:30-4:45 pm	Exam 4	9	20
05/11/17	3:15-5:15 pm	Exam 5	comprehensive	20

No makeup exams will be scheduled. The result of one exam can be dropped. That is, only the four best grades of the five exams count towards the final grade. All exams are open lecture notes and open book(s). A calculator may be used; all other electronic devices must be turned off and stored. The use of calculator software in cell phones, translators, laptop computers, etc., is not permitted on an exam.

Grading: Grading will be based on the homework score (max 80pts) and the best 4 out of 5 exams (max 80pts+80pts=160pts). The maximal number or points is thus 160.

Bonus points can be obtained for excellent in-class contributions, high-quality presentations on the blackboard, and very elegant homework solutions. The grading scheme is:

Grade	Percentage	Points
A	88-100	141-160
B	77-88	124-140
C	66-77	106-123
D	55-66	88-105
F	0-55	0-87

Additional Statements: *Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders. Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office as soon as possible. The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.*