

# PHYS 500A: MATHEMATICAL METHODS

SYLLABUS (2021 Fall)

*Department of Physics, Southern Illinois University–Carbondale*

Last updated: October 15, 2021

## 1 General information:

Instructor: K. V. Shajesh

Office: Neckers 491, Tel.: +1(618)453-5212.

Email: [shajesh@siu.edu](mailto:shajesh@siu.edu)

Web-page: <http://www.sphics.com>

Class meetings: MF 9:35-10:50 AM, in Neckers 404.

Office hours: MF 11:00 AM-1:00 PM; TR 3:00-4:00 PM.

## 2 Prerequisites:

Familiarity with the following topics will be assumed: vector calculus, matrix algebra, linear differential equations.

## 3 Course description

We will cover the following topics: tensor algebra, contour integration in complex analysis, Green's function method to solve nonhomogeneous partial differential equations, spherical harmonics, perturbation techniques.

### References

1. *Methods of Theoretical Physics*, Part 1 and 2, by Philip M. Morse and Herman Feshbach.
2. *Mathematical Methods for Physicists*, 6th Edition, by George B. Arfken and Hans J. Weber.

### Webpage

Lecture notes and homework will be posted at

<http://www.sphics.com/tc/202108-SIU-P500A/>.

It is advised to download relevant materials to your computer, because the website (or the Internet) could be occasionally down.

### Lectures

Lectures will be delivered in the traditional classroom style. The lectures will be recorded using a web camera. These recordings will be made available on YouTube as 'Unlisted' videos. These videos will not be public in the sense that it will not show up under a search, but anyone with the link to the video can access it.

## 4 Course work

### Evaluation

Homework	30 %
Midterm Exams ( $2 \times 20\%$ )	40 %
Classroom Quizzes	10 % and $y$ in Eq. (1)
Final Exam	20 %

## Homework

Homework will be assigned regularly. Students are encouraged to discuss homework problems with their peers, refer to additional books, and use resources on the Internet. But, each student should submit their own work describing detailed steps of their thought process.

## Exams

Three examinations (including the Final Exam) will be administered.

Midterm Exam 1	September 24 (Friday, in class)
Midterm Exam 2	October 29 (Friday, in class)
Final Exam	December 10 (Friday, 8:00-10:00 AM)

The midterm exams will assess you on concepts covered in lectures and homework. All the midterm exams will be cumulative, but you are recommended to concentrate more on topics covered in the later part of the semester.

## Grading

The grading will be done on a scale of 0-100. This Raw Score  $x$  (out of 100) should be used to assess your knowledge in the subject. The raw score will be converted to the university scale using the following formula for Your Score  $x'$ ,

$$x' = x + ay(100 - x), \tag{1}$$

where  $0 \leq a \leq 1$  is the curve parameter chosen by the instructor and  $0 \leq y \leq 1$  is determined by your score in Classroom Quizzes (out of 1.00). For example, for  $a = 0.50$  and  $y = 0.75$ , a Raw Score of 60 will lead to Your Score of 75.

## 5 Syllabus Attachment

The Provost Office has created a “Syllabus Attachment” to assist the student. It lists and provides web links for many elements that are important for a student. Kindly find it attached.

# Syllabus Attachment

Fall 2021

CARBONDALE

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIUC embraces a unique tradition of access and opportunity, inclusive excellence, innovation in research and creativity, and outstanding teaching focused on nurturing student success. As a nationally ranked public research university and regional economic catalyst, we create and exchange knowledge to shape future leaders, improve our communities, and transform lives.

## IMPORTANT DATES

Semester Classes Begin:.....	08/16/2021
Last day to add full-term course (without Dean's signature): .....	08/22/2021
Last day to withdraw from the University with a full refund:.....	08/27/2021
Last day to drop a full-term course for a credit/refund:.....	08/29/2021
Last day to drop a full-term course (W grade, no refund):.....	10/24/2021
Final examinations: .....	12/06–12/10/2021

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at <http://registrar.siu.edu/calendars>. For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at <http://registrar.siu.edu/schedclass/index.php>

## FALL SEMESTER HOLIDAYS

Labor Day 09/06/2021  
Veterans Day 11/11/2021  
Thanksgiving Break 11/20-11/28/2021

## DIVERSITY

Southern Illinois University Carbondale's goal is to provide a welcoming campus where all of our students, faculty and staff can study and work in a respectful, positive environment free from racism and intimidation. For more information visit: <https://diversity.siu.edu>. Additional informational flyer: [https://diversity.siu.edu/common/documents/help\\_contacts.pdf](https://diversity.siu.edu/common/documents/help_contacts.pdf).

## DISABILITY SUPPORT SERVICES

SIUC Carbondale is committed to providing an inclusive and accessible experience for all students with disabilities. Disability Support Services coordinates the implementation of accommodations. If you think you may be eligible for accommodations but have not yet obtained approval please contact DSS immediately at (618) 453-5738 or <https://disabilityservices.siu.edu>. You may request accommodations at any time, but timely requests help to insure accommodations are in place when needed. Accommodations and services are determined through an interactive process with students and may involve consideration of specific course design and learning objectives in consultation with faculty.

## MILITARY COMMUNITY

There are complexities of being a member of the military community and also a student, and military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at <http://veterans.siu.edu/>.

## STUDENT MULTICULTURAL RESOURCE CENTER

The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow and succeed. We encourage you to stop by the Center, located in the Student Services Building Room 140, to see the resources available and discover ways you can get involved on the campus. Visit us at <https://smrc.siu.edu/>.

## SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress-physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIUC will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For information on Saluki Cares: Call (618) 453-2461, email [siucares@siu.edu](mailto:siucares@siu.edu), or <http://salukicare.siu.edu/>.

## SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: <http://safe.siu.edu>

## COVID-19

SIUC's policy on face masks and social distancing is consistent with the guidance from the Centers for Disease Control and Prevention and the Illinois Department of Public Health. For up-to-date information, students, faculty, and staff should visit SIUC's COVID website (<https://siu.edu/coronavirus>), which includes the Saluki Safety Plan. People can also send email to [pandemicinfo@siu.edu](mailto:pandemicinfo@siu.edu).

## WITHDRAWAL POLICY ~ Undergraduate only

Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIUC visit: <http://registrar.siu.edu/students/withdrawal.php>

## SIUC's EARLY WARNING INTERVENTION PROGRAM (EWIP)

Students enrolled in courses participating in SIUC's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the University Core Curriculum's Overview webpage: <http://corecurriculum.siu.edu/program-overview/>.

## EMERGENCY PROCEDURES

We ask that you become familiar with Emergency Preparedness at SIUC. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness at SIUC website, and through text and email alerts. To register for alerts visit: <http://emergency.siu.edu/>

## CATALOGS

[catalog.siu.edu](http://catalog.siu.edu)  
[gradcatalog.siu.edu](http://gradcatalog.siu.edu)

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog.

## CENTER FOR LEARNING AND SUPPORT SERVICES

Tutoring: <http://tutoring.siu.edu/>  
Math Labs: <http://math.siu.edu/courses/course-help.php>

WRITING CENTER: <http://write.siu.edu/>

## PLAGIARISM

See the Student Conduct Code: <http://srr.siu.edu/student-conduct-code/>

## INCOMPLETE POLICY~ Undergraduate only

<http://registrar.siu.edu/grades/incomplete.php>

REPEAT POLICY: <http://registrar.siu.edu/students/repeatclasses.php>

MORRIS LIBRARY HOURS: <http://libguides.lib.siu.edu/hours>

ADVISEMENT: <http://advisement.siu.edu/>

SIUC ONLINE: <https://online.siu.edu/>

Need additional help with an issue? Visit SALUKI SOLUTION FINDER at <http://solutionfinder.siu.edu/>