

# PHYS 500A: MATHEMATICAL METHODS

SYLLABUS (2019 Fall)

*Department of Physics, Southern Illinois University–Carbondale*

Last updated: October 29, 2019

## 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.physics.siu.edu/~shajesh>  
Class meetings: TR 9:35-10:50 AM, in Neckers 410.  
Office hours: TR 12:00-2:00 PM; W 11:00 AM-1:00 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.physics.siu.edu/~shajesh/tc/201908-SIU-P500A/>.

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

## 4 Course work

### Evaluation

Homework	40 %
Midterm Exams ( $2 \times 20$ %)	40 %
Extra Credit Work	$y$ in Eq. (2)
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 (Tuesday, in class)
Midterm Exam 2	October 29 (Tuesday, in class)
Final Exam	December 12 (Thursday, 10:15 AM-12:15 PM)

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  $x'$ ,

$$x' = x + a(100 - x), \quad (1)$$

where  $0 \leq a \leq 1$  is the curve parameter. The curve parameter  $a$  is calculated as

$$a = a_0 \frac{(1 + y)}{2}, \quad (2)$$

where  $a_0$  is the primary curve parameter that is decided by the instructor. The curve parameter can be boosted by submitting problems assigned for Extra Credit,  $y$  being the total score in Extra Credit submissions (out of 1.00). For example, for  $a = 0.50$ , a Raw Score of 60 will lead to Your Score of 80.

## 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 2019

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIU 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: .....08/19/2019  
Last day to add full-term course (without Dean's signature): .....08/25/2019  
Last day to withdraw from the University with a full refund: .....08/30/2019  
Last day to drop a full-term course for a credit/refund: .....09/01/2019  
Last day to drop a full-term course (W grade, no refund): .....10/27/2019  
Final examinations: .....12/9—12/13/2019

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at <https://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 <https://registrar.siu.edu/schedclass/index.php>

## FALL SEMESTER HOLIDAYS

Labor Day Holiday 09/02/2019  
Veterans Day Holiday 11/11/2019  
Thanksgiving Break 11/23—12/1/2019

## 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/#>

## DISABILITY SUPPORT SERVICES

SIU 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 <https://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, SIU 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 <https://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: <https://safe.siu.edu>

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

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

SIU ONLINE: <https://online.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 SIU visit:

<https://registrar.siu.edu/students/withdrawal.php>

## INCOMPLETE POLICY~ Undergraduate only

An INC grade may be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments for the course. An INC must be changed to a completed grade within one full semester (undergraduates), and one full year (graduate students), from the close of the term in which the course was taken or graduation, whichever occurs first. Should the student fail to complete the remaining course requirements within the time period designated, the incomplete will be converted to a grade of F and such grade will be computed in the student's grade point average. For more information visit:

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

## REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit more than once. For students receiving a letter grade of A, B, C, D, or F, the course repetition must occur at Southern Illinois University Carbondale. Effective for courses taken Summer 2013 or later, only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned.

This policy will be applied to all transferrable credit in that only the last grade will be used to calculate grade point average. Only those courses taken at the same institution are considered repeats under this policy. See full policy at

<https://registrar.siu.edu/students/repeatclasses.php>

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

Students enrolled in courses participating in SIU's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the Core Curriculum's Overview webpage:

<https://corecurriculum.siu.edu/program-overview/>

## EMERGENCY PROCEDURES

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

## CENTER FOR LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:

Tutoring : <https://class.siu.edu/tutoring/>

Math Labs <https://math.siu.edu/courses/course-help.php>

## WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit:

<https://write.siu.edu/>

## GRADUATE POLICIES

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

<https://gradschool.siu.edu/about-us/grad-catalog/>

Need help with an issue? Please visit SALUKI SOLUTION FINDER at

<https://solutionfinder.siu.edu/>

## PLAGIARISM

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