

Sept	4	Labor Day. University Closed
Sept	5	First Day of Classes
Sept	11	Last Day to Add/Drop a Class
Sept	11	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	12	W Grades Posted for Course Withdrawals
Sept	18	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
Oct	2	Last Day for 50% Refund, Full Withdrawal
Oct	23	Last Day for 25% Refund, Full Withdrawal
Nov	13	Last Day to Withdraw from Classes
Nov	21	<b>Thursday Classes Meet</b>
Nov	22	Friday Classes Meet
Nov	23	Thanksgiving Recess Begins. No Classes
Nov	26	Thanksgiving Recess Ends
Dec	13	Last Day of Classes
Dec	14	Reading Day 1
Dec	15	Reading Day 2
Dec	16	Saturday Classes Meet
Dec	17	Final Exams Begin
Dec	23	Final Exams End
Dec	25	Final Grades Due

## CHE 724: Sustainable Energy

### 1. ChE724 Sustainable Energy, Fall 2023

Type	Time	Days	Where	Date Range	Schedule Type	Instructors
Class	6:00pm-8:50pm	R	TIER 112	9/7-12/15	Lecture	Xianqin Wang

### 2. Credits and contact hours

(3-0-3) (Lecture hr/wk-lab hr/wk-course credits)

### 3. Course coordinator/instructor

Dr. Xianqin Wang

[xianqin@njit.edu](mailto:xianqin@njit.edu) (e-mail)

**Office Hours:** Thursday: 3:30pm-4:30pm

You can make appointment with me by email ([xianqin@njit.edu](mailto:xianqin@njit.edu)) if the office hour time does not work for you.

### 4. Textbook

Lecture notes are based on the following textbooks, current energy policies and current research papers. The notes will be uploaded to Canvas after each lecture.

Recommended textbooks

1) [Sustainable Energy, second edition: Choosing Among Options \(The MIT Press\)](#) second edition, by Jefferson W. Tester (Author), Elisabeth M. Drake (Author), Michael J. Discoll (Author), Michael W. Golay (Author), William A. Peters (Author), 2012

ISBN-10 : 0262017474

ISBN-13 : 978-0262017473

2) [Fundamentals of Renewable Energy Processes, Second Edition](#) by Aldo V. da Rosa (Hardcover - April 15, 2009) ebook ISBN: 9780080878232

3) [Renewable Energy: Power for a Sustainable Future](#), Oxford University Press; 4th edition (February 3, 2018)

ISBN-10 : 0198759754

ISBN-13 : 978-0198759751

4) [Carbon Management for a Sustainable Environment](#) 1st ed. 2020 Edition, Springer;

ISBN-10 : 3030350614

ISBN-13 : 978-3030350611

### 5. Specific course information

#### Prerequisites/Co-requisites

MS and PhD graduate students with basic knowledge in chemistry, materials and physics.

#### Course Description

The course is a project-based advanced graduate course which requires strong background in engineering thermodynamics and transport phenomena. The main goals of this course are to gain an understanding of the cost-benefit ratio of various alternative energy sources and to understand some of the various obstacles associated with current and conventional technologies and industrial applications. Different renewable and conventional energy technologies will be discussed in class. Course materials include biomass energy, fossil fuels, geothermal energy, nuclear power, wind power, solar energy, hydrogen fuel, hydropower, batteries and fuel cells. Students will learn a quantitative framework to aid in evaluation and analysis of energy technology systems in the context of engineering, political, social, economic, and environmental goals.

## 6. Topics

Future Fossil Fuels  
Carbon Management Techniques  
Solar Power  
Bioenergy  
Hydrogen  
Fuel Cells and Batteries  
Hydropower and Tidal and Wave Power  
Wind Energy and Geothermal Power  
Nuclear Energy

## 7. Course Learning Outcomes

By the end of the course, students will be able to:

- 1) Explain energy principles and their sustainability.
- 2) Describe the technology, environmental impact and safety of each sustainable resource.
- 3) Explain economic and political issues around sustainable energy sources.
- 4) Evaluate, compare and select energy systems based on economic and environmental considerations.
- 5) Evaluate and compare energy efficiency for each different type of energy resources.
- 6) Communicate data, ideas, analysis, results in written form and orally
- 7) Participate in the establishment of goals and workplan of the team.
- 8) Contribute to the development of a collaborative team environment.
- 9) Acquire and apply new knowledge as needed, using appropriate learning strategies

## 8. Grading and Policy on Assignments

### Grading Policy

[NJIT Grading Legend](#)

### Final Grade Calculation

Final grades for all assignments will be based on the following percentages:

Homework (individual effort)	25%
Discussion Forums (Canvas)	25%
Team Project (Presentation 25%, Project report 25%)	50%

### Course Work

**Homework: (25% of grade)** Assignments will be given on each topic. You are required to read articles on the topics covered during the lecture and answer questions. HW assignments will be posted in the class Canvas. HW submissions are required to be submitted to the class Canvas before the due date.

**Discussion Forums: (25% of grade)** There are several discussions throughout the course and you are required to participate in discussion forums in Canvas. When all students participate in a discussion, it creates an active learning environment that will help you better understand the materials and be more successful in the class. You will post their initial response to the prompt by Fridays at 11:59pm and respond to two classmates by Sunday at 11:59pm of the week they are listed.

Each group will be required to comment on other groups' project presentations.

**Team Projects: (50% of grade)** You form your team with 2-3 members.

Each group will design a creative system or unit using renewable energy for daily life or for the industry. The project should include a description of the design (draw pictures if necessary) (**written report**), and a

recorded oral presentation from all the group members (**oral presentation**). Both files are required to upload to canvas before the due dates.

*Written report:* 20-30 pages technical paper on approved topic with overview, presentation of present status and issues, analysis of sustainability options for the future, and references. All pages must be formatted to fit on 8-1/2 by 11 inch paper with no smaller than 12 point font and margins not less than one inch on every side.

*Oral presentation:* 25-minute formal oral presentation (time length may change based on the number of groups formed) of the topic selected for the term paper is required. **Each group member should contribute to the presentation.**

**Group activities policy:** Each student will be asked at the end of the semester to confidentially rate his/her performance/effort as well as that of all his/her groupmates. This rating will reflect the performance when the members were actually present. The evaluation form will be uploaded in Canvas and the completed evaluation form has to be submitted to Canvas by the **reading day**.

**NJIT HONOR CODE:** The NJIT honor code is being upheld on all issues related to the course. Students are expected to be familiar with the code and conduct themselves accordingly.

### **Feedback**

I will deliver feedback on each assignment using the comments feature in Canvas

### **Letter to Number Grade Conversions**

A	90-100
B+	85-89
B	80-84
C+	75-79
C	70-74
D	65-69
F	0-64

### **Exam Information and Policies**

This course does not have any exams. Per the NJIT [Online Course Exam Proctoring Policy](#), this course will use authentic assessment, meaning you will be assessed and graded on your ability to deliver real-world outputs as well as your participation and feedback to other students.

### **Policy for Late Work**

50% points will be deducted for the late submissions. The late submission cannot be submitted 2 days past the due date!

## Academic Integrity

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the [NJIT academic code of integrity policy](#).”

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu)”

## Netiquette

Throughout this course, you are expected to be courteous and respectful to classmates by being polite, active participants. You should respond to discussion forum assignments in a timely manner so that your classmates have adequate time to respond to your posts. Please respect opinions, even those that differ from your own, and avoid using profanity or offensive language.

## Weekly Expectations

Include a clear explanation of course expectations and what students need to do each week to be successful. For example, “This course is organized by weekly modules. Each week, students must watch a lecture video, complete a reading assignment, and participate in a class discussion forum by Friday at 11:59pm.”

## 9. Tentative Course Schedule

The topics below are tentative since there might be a couple of invited speakers from industries to give talks.

Week	Date	Tentative topic
1	9/8/2023	Introduction to Sustainable Energy
2	9/15/2023	Future Fossil Fuels
3	9/22/2023	Carbon Management Techniques
4	9/29/2023	Solar Thermal Energy
5	10/6/2023	Solar Photovoltaics
6	10/13/2023	Bioenergy
7	10/20/2023	Hydrogen
8	10/27/2023	Fuel Cells
9	11/3/2023	Batteries
10	11/10/2023	Hydropower and Tidal and Wave Power
	11/13/2023	Last day to withdraw from classes
11	11/17/2023	Wind Energy
12	11/21/2023	Nuclear Energy
13	12/1/2023	Geothermal Power
14	12/8/2023	Project Presentation
15	12/15/2023	Project report finalizing and submission

## **Student Resources:**

### [Academic Advising Success Center](#)

“...assist in the advisement of students who are undecided in their major, transitioning into another major at NJIT, and those students who need additional support to graduate successfully and in a timely manner.”

### [Academic Integrity](#)

NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Students. In the cases the Honor Code violations are detected, the punishments range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT with notations on students' permanent record. Avoid situations where honorable behavior could be misinterpreted.

### [Academic Support and Student Affairs](#)

“From questions about becoming a student at NJIT – to student engagement – to searching for information on career development, the Division of Academic Support and Student Affairs Staff is here to help.”

### [Additional Tutoring Centers](#)

[Math Learning Center](#); [Chemistry Learning Center](#); [The Writing Center](#); [ECE Study Groups](#)

### [Bookstore](#)

“Show your New Jersey Institute Of Technology pride all year long with our authentic assortment of New Jersey Institute Of Technology collegiate apparel...Plus, our selection of [textbooks](#), [computers](#), and [supplies](#) will ensure every New Jersey Institute Of Technology student is prepared for success.”

### [Center for Counseling and Psychological Services](#)

“The NJIT Center for Counseling and Psychological Services (C-CAPS) is committed to assisting students in the achievement of their academic goals as well as benefiting from their personal experience on campus. College life can be personally challenging and stressful at times. We believe that the educational process is an important component of the development of the individual as a whole person. Our goal is to optimize the college experience and improve the quality of the lives of our students by promoting their mental health and facilitating students' personal, academic and professional growth.”

### [Disability Support Services](#)

“The Disability Support Services office works in partnership with administrators, faculty and staff to provide reasonable accommodations and support services for students with disabilities that have provided our office with documentation to receive services.”

### [IST Service Desk](#)

“The IST Service Desk is the central hub for computing information and first point of contact for getting help and reporting issues related to computing technology at NJIT.

There is much technology here at NJIT, and many ways to find information or get help with it.”

[The Learning Center](#)

“Our mission is to assist students both in the classroom and beyond by providing tutorial services, academic coaching, academic and personal enrichment workshops and staff and peer support so students can meet the demands of their coursework and are prepared for life after graduation.”

[Moodle Help Page](#)

Tutorials for students.

[Robert W. Van Houten Library](#)

“The Van Houten Library offers electronic and print resources essential to the mission of New Jersey's science and technology university, including a core collection of academic books, databases, and journals, as well as research and consultation services.”

[Student Financial Aid Services](#)

“Student Financial Aid Services (SFAS) at NJIT is committed to providing you with every opportunity to obtain funding to support your undergraduate educational costs at NJIT.”

ChE 724 Sustainable Energy

Self and Peer Rating of Project Team Members

Name \_\_\_\_\_ Group # \_\_\_\_\_

Please write the names of all of your team members, **INCLUDING YOURSELF**, and rate the degree to which each member fulfilled his/her responsibilities in completing the project assignment. The possible ratings are as follows:

- Excellent** Consistently went above and beyond (tutored teammates, carried more than his/her fair share of the load)
- Very good** Consistently did what he/she was supposed to do, very well prepared and cooperative
- Satisfactory** Usually did what he/she was supposed to do, acceptably prepared and cooperative
- Ordinary** Often did what he/she was supposed to do, minimally prepared and cooperative
- Marginal** Sometimes failed to show up or complete assignments, rarely prepared
- Deficient** Often failed to show up or complete assignments, rarely prepared
- Unsatisfactory** Consistently failed to show up or complete assignments, unprepared
- Superficial** Practically no participation
- No show** No participation at all

*These ratings should reflect each individual's level of participation, effort, and sense of responsibility, **NOT** his or her academic ability.*

NAME OF TEAM MEMBER	RATING
_____	_____
_____	_____
_____	_____
_____	_____

Your signature: \_\_\_\_\_