

Course Syllabus

1	Course title	Meteorology	
2	Course number	0305203	
3	Credit hours	3 hrs. (Theory)	3 hrs. (Theory)
	Contact hours (theory, practical)	3 hrs. (Theory / week)	
4	Prerequisites/corequisites	0305101	
5	Program title	B. Sc. In Geology	
6	Program code	0305 2	
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Geology	
10	Course level	2 nd year B.Sc.	
11	Year of study and semester (s)		
12	Other department (s) involved in teaching the course	B. Sc. In Geology	
13	Main teaching language	None	
14	Delivery method	<input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input checked="" type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	08-10-2023	

17 Course Coordinator:

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18 Other instructors:

Name:

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19 Course Description:

As stated in the approved study plan.

Welcome to Introduction to Meteorology! This course introduces atmospheric phenomena and weather. It is designed to provide comprehensive knowledge of the earth's atmosphere and its changing behavior as it relates to human activities and how it influences our daily lives. This course provides a first look at various aspects of meteorology including solar radiation, global circulation, environmental issues, winds, cloud formation, stability, precipitation processes, weather systems, and severe weather. The course will also cover meteorological terminology, large-scale climate processes such as El Niño, and will discuss techniques of weather forecasting. Basic physical principles and processes are emphasized that are important for understanding the world and have broad implications for students interested in weather and global environmental change and other environmental disciplines.

20 Course aims and outcomes:

A- Aims:

By the end of the course you will be able to:

1. Describe the layers of the atmosphere from the surface to 100 km
2. Recognize cloud types and be able to describe their formation mechanisms
3. Plot and interpret vertical temperature and moisture soundings

B. Describe and explain the structure, physics and dynamics of thunderstorms, tornadoes hurricanes and hail formation

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

1. Demonstrate a familiarity with the basic vocabulary of meteorology and understand the mechanics of the earth's atmosphere.
2. Describe and explain the origin, composition, structure, short-term and long-term behaviors of the earth's atmosphere.
3. Critically examine the phenomena of the Solar and Terrestrial Radiation and understanding the energy transfer by radiation, conduction, convection, and evapotranspiration and explain the factors that determine the distribution of solar energy over the Earth's surface and describe global patterns of temperature.
4. Understand and critically examine the atmospheric phenomena of temperature, moisture conditions, atmospheric stability, forms of condensation and precipitation, air pressure and winds, circulation of the atmosphere, role of air masses, and weather patterns.
5. Describe the major cloud types and explain the phenomena of rainfall, fog, snow, sleet, and frost.
6. Define a cold and warm front, explain the processes leading to the formation of each, and explain the formation of cyclones and anticyclones, tornadoes, hurricanes and typhoons.
7. Understand and describe the formation of thunderstorms, lightning and thunder.
8. Differentiate between global warming and the greenhouse effect

SLOs SLOs of the course	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)	SLO (7)	SLO (8)	SLO (9)
1	X	X							
2	X	X							
3	X	X					X	X	X
4	X	X					X	X	X
5	X	X					X	X	X
6	X	X					X	X	X
7	X	X					X	X	X
8	X	X					X	X	X

21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1,2	Chapter 1: Earth and Its Atmosphere	Describe the layers of the atmosphere, including their altitudes, temperatures, compositions, and functions Differentiate between weather and climate	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
2	3,4	Chapter 2: Energy: Warming and cooling earth and the Atmosphere	Define the terms energy, potential energy, kinetic energy, radiant energy, temperature, and heat Compare and contrast the Fahrenheit, Celsius, and Kelvin temperature scales Differentiate heat capacity, specific heat, latent heat, and sensible heat Describe the devices and techniques used to measure Temperature	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
3	5,6	Chapter 3: Seasonal and daily Temperatures	Illustrate how earth's seasons, including the number of daylight hours, are determined by earth's distance from the Sun and the angle of earth's rotational axis explain how cooling degree days, heating degree days, and growing degree days are defined and used	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
4	7,8	Chapter 4: Atmospheric Humidity	Analyze earth's hydrologic cycle Differentiate among relative humidity, absolute humidity, specific humidity, and mixing ratio Compare and contrast actual vapor pressure, saturation vapor pressure, relative humidity, and dew point Describe the devices and techniques used to measure humidity	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
First Exam								
5	9,10	Chapter 5: Condensations: dew, Fog, and clouds	Differentiate among the processes and conditions that lead to the formation of dew, frozen dew, and frost Describe the primary types of condensation nuclei, including their sizes and origins Create a diagram that illustrates and labels the ten primary cloud types	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
6	11,12	Chapter 6: Stability and cloud development	Define the terms adiabatic process, dry adiabatic process, and moist adiabatic rate	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
7	13,14	Chapter 7: Precipitation	Describe the collision-coalescence process Describe how ice crystals can grow at the expense of water droplets Measure precipitation at the point where it falls	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
8	15,16	Chapter 8: Air Pressure and Winds	Explain the difference between geostrophic and gradient winds Discuss how winds blow around high and low pressure centers in the Northern and Southern hemispheres	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald

9	17, 18	Chapter 9: Wind: Small-Scale and local Systems	List the four main scales of atmospheric motion and at least one weather phenomenon associated with each scale List the four main scales of atmospheric motion and at least one weather phenomenon associated with each scale	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
Second Exam								
10	19, 20	Chapter 10: Wind: Global Systems	Explain the single-cell and three-cell air flow models using diagrams and written explanations Create maps of the semi-permanent lows and highs observed on Earth during January and July Describe the atmospheric conditions that produce El Niño and La Niña events	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
11	21, 22	Chapter 11: Air masses and Fronts	Define the terms air mass and source region Define the terms front, frontal zone, polar front, and arctic front	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
12	23, 24	Chapter 12: Middle-latitude cyclones	Identify the locations of the warm front, cold front, occluded front, triple point, and secondary low on a diagram of a mature wave cyclone Define the terms barotropic, baroclinic, warm advection, and cold advection	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
13	25, 26	Chapter 13: Weather Forecasting	Describe the types of observations used in weather forecasting Define meteogram and sounding Discuss the sequence of events involved in making a forecast based on upper-air, surface, satellite, and radar data	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
14	27, 28	Chapter 14: Thunderstorms	Illustrate the three stages of an ordinary cell thunderstorm Compare and contrast ordinary cell, multicell, and supercell thunderstorms Explain how long it takes thunder to travel from a lightning flash	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
15	29, 30	Chapter 15: Tornadoes	Explain the difference between a tornado and a funnel cloud List the stages of the tornado life cycle Discuss how the Enhanced Fujita Scale is used to assess tornado strength	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
16	31, 32	Chapter 16: Hurricanes	Define hurricane, tropical storm, tropical depression, and tropical cyclone Discuss the Saffir-Simpson Hurricane Wind Scale and its uses	Online	Microsoft Teams	Asynchronous Lecturing	H5P	Meteorology Today: 12th edition by Ahrens. Donald
Final Exam								

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
First Exam	30	Chapters 1-4	1, 2	6	Face to face
Midterm Exam	30	Chapters 5-10	1,2, 7,8	12	Face to face
Final Exam	40	Chapters 11-16	1,2, 7, 8, 9	16	Face to face

23 Course Requirements

All students are expected to follow the policies of the Student Code of Ethics as outlined in the Student Handbook (e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

22 Course Policies:

A- Attendance policies:

Attendance Policy: attendance is mandatory. Class non-attendance usually results in poor grades

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating may, at my discretion, result in an **F** for the course

E- Grading policy:

During class lectures, please make sure that all cell phones and pagers are silenced or are in vibrate mode. If you need to answer an urgent call (except during an exam), please leave the class to speak on the phone

F- Available university services that support achievement in the course:

23 References:

A- Required book(s), assigned reading and audio-visuals:

a. Meteorology Today: 12th edition by Ahrens, C. Donald B- Recommended books, materials, and media:

a. Essentials of Meteorology: An Invitation to the Atmosphere, 6th or 7th edition by Ahrens, C. Donald.

b. The Atmosphere: An Introduction to Meteorology 11th edition by Lutgens and Tarbuck.

24 Additional information:

Name of Course Coordinator: Prof. Dr. Mustafa Al Kuisi	Signature: <i>Mustafa Al Kuisi</i>	Date: 08-10-2023
Head of Curriculum Committee/Department: Prof. Dr. Mustafa Al Kuisi	Signature: <i>Mustafa Al Kuisi</i>	Date: 08-10-2023
Head of Department: Prof. Dr. Mustafa Al Kuisi	Signature: <i>Mustafa Al Kuisi</i>	Date: 08-10-2023
Head of Curriculum Committee/Faculty: Prof. Dr. Mustafa Al Kuisi	Signature: <i>Mustafa Al Kuisi</i>	Date: 08-10-2023
Dean: Prof. Dr. Mahmoud Jaghoub	Signature:	Date: 08-10-2023