وهزارهتی خوێندنی بالآ و تویژینهوهی زانستی

Department of General Science

College of Basic Education

University of Salahaddin

Subject: **Astronomy**

Course Book : **Third Class (One Course)**

Lecturer's name : **Chiman Ibrahim Husain**

Academic Year: 2023/2024

Course Book

1. Astronomy	1. Course name
Chiman Ibrahim Husain	2. Lecturer in charge
General Science /Basic Education	3. Department/ College
4. Contact	E-mail: chiman.hussen@su.edu.krd Tel: (optional)
5. Time (in hours) per week	For example Theory: 3 Practical: No practical
6. Office hours	Three hours during lessen and other time if necessary
7. Course code	
8. Teacher's academic profile	I accepted as a student in the University of Salahaddin-Erbil / Iraq, college of education / physics department in 1999-2000 in the first stage. After that I passed all stages successfully and I got the first order at all students (I was At the top of series of list of my department in 2002-2003 and I got the certification of <u>Buctular</u> . Also In 2008-2009, I accepted in MSc for the University of Salahaddin-Erbil / Iraq, education physics department and I got the certification of MSc In Astronomy science. I got the order of assistant lecturer. After that I have taught the students in Salahaddin University college of Basic Education till now.
9. Keywords	Topics include two parts Meteorology and astronomy, atmosphere layers and their properties ,celestial observations, history of astronomy, earth's motions, time and the calendar, lunar motions, solar system, and their features. Stars, stellar evolution, galaxies and origin of the universe.

10. Course overview: The course divided into to parts A- Meteorology B- Astronomy Can describe these two parts as following Meteorological phenomena are observable weather events that illuminate, and are explained by the science of meteorology. Those events are bound by the variables of Earth's atmosphere: temperature, air pressure, water vapor, and the gradients and interactions of each variable, and how they change over time. Different spatial scales are studied to determine how systems on local, regional, and global levels impact weather and climatology. The goal of the department of Physics, Astronomy and Meteorology is to provide students the opportunity to understand the physical laws governing the universe. The fundamental relationships between energy and matter are studied, from the age of the ancient scientists through the eras of Newton and Einstein and

up to the present day. Applications are made to the fields of astronomy, earth and planetary sciences, electronics, engineering, meteorology and to the many branches of physics, from classical mechanics to quantum nuclear physics. In addition to experiencing practical applications of the laws of nature, students develop an understanding of the role of science and technology in contemporary society. Consistent with the university's mission and with students to serve when completed the studies in university, as a result accessible for pupils in school. The program of the study in the basic school for pupils cover some field by the Astronomy and Meteorology Provides an understanding of the relationship between classical and modern physics and their application to the more applied disciplines of astronomy, earth and planetary sciences, and meteorology. Describe the earth atmosphere layers, change of weather and climate, atmosphere composition and their distribution, gases content permanent and variable gases and finally the parameters effect the changing in the atmosphere, effect of ionosphere on communication and extent of greenhouse for retain earth warm. By applying some basic theories and important physical laws can be describe these content, and main contributions of Copernicus, Tycho Brahe, Galileo, Kepler, .Newton's law Planck, Stefan Boltzmann..etc Essentially State Kepler's Laws of Planetary Motion. and State Newton's Law of Universal Gravitation. Explain the Cosmological expansion of the universe. Theories of the evolution of the universe and the original of the solar system. Explain the classify planets as terrestrial and Jovian and differences them explanation for the formation of the solar system. For each planet in our solar system, discuss its unique characteristics. Describe the internal structure of the sun in detail.. Describe the Hertzsprung Russell diagram and explain where our own sun lies on this diagram and what that tells us about it. Explain the differences between luminosity and apparent brightness. And study the relation between age of the stars, life time, luminosity, radius ets Then explain expansion of universe, big bang and black hole.

11. Course objective: Course Objectives for Astronomy can be step as following Analyze astronomical concepts as they relate to celestial body classification, sky chart interpretation, and cosmological studies. Apply the concepts of meteorological analysis to atmospheric phenomena classification, weather map interpretation and prediction, and climatological studies. Demonstrate an ability of students to replying the examination of the astronomy and meteorology course, about the information, they are reading and obtained during the course. Employ the scientific method of inquiry to investigate objective in order to understanding students For understanding and recognize the influence of both historical and present discoveries in astronomy and meteorology to our daily lives. study meteorology in order to Warning of severe weather Agriculture Timing of planting, harvesting, etc to avoid bad weather, hazards to livestock Transport & services Shipping, aviation, flood warnings, • Commerce We are studying the Astronomy and meteorology, because have relation between them and the life of human in difference fields

12. Student's obligation

The important role of students for interest the lecture and understanding must be attendance in all lecture, and then write notes through their lecture, and contribute question and their answer, for preparing for examination Students as well must be doing all homework and reading all home works.

13. Forms of teaching

I am using the following method for teaching 1- Power point 2- white board for writing most important explanation solve problem 3- some video part of the solar system, data show.

14. Assessment scheme

Breakdown of overall assessment and examination For assessing the students by applying the following steps

1-Examination 33%

2- daily Activity 2 %

3-   attendance of students 5%

4- Final Exam% 60.

15. Student learning outcome: At the completion of this course the successful student will be able to do the following: If the students trying responsibility for understanding during lecture, may be benefit for their mission, and then successful in their studies in school. There are relationship between course of astronomy and meteorology with the programs in the school which they are studies The students understand more term, which relate to their environment surrounding the life, as well as the term according to the programs in the basic school Such as meaning of astronomy, meteorology, climate, weather , atmosphere layer ,pressure, greenhouses, ionosphere, temperature, humidity, solar system, Planets, stars, solar energy, Kepler's law, gravitational force, These above term may be explain by applying some theories such energy classical mechanics, Planck's quantum theory and some concept of mode

16. Course Reading List and References:

1- Key references:

2- Astrophysics is Easy! An Introduction for the Amateur Astronomer (mike indlis (2007.) .

3- Sun, mercury and versus Linda T. Ekina Tanton and the moon Linda T. Ekina Tanton (2006) .

4- Earth and the moon Linda T. Ekina Tanton(2006) . .

Useful references:

1- Foundation of astronomy, Michael. A seeds 2008
2- Giant Planets of Our Solar System introduction, Patrick G. J. Irwin. 2006.
3- Modern Almagest An Updated Version of Ptolemy's Model of the Solar System.
4- OUR SOLAR SYSTEM AND HOME PLANET... THE EARTHSHAMA THAKOOR.2010.
5- Mars Linda T. Ekina Tanton.(2006)
6- Introduction to Astronomy and Cosmology, Ian Morison University of Manchester, UK. (2008).
7- The Future of the Universe. Jack Meadows (2007).
8- Century Astronomy , Jeff Hester and etc (2010).

Lecturer's name	First semester
Lecturer's name CHiman Ibrahim Hussen ex: (3 hrs)	ex: 12/09/2021 until 1-2-2022
Chapter one **Astronomy** 1 st , 2nd , 3rd 4 th, 5th weeks	**Chapter one Astronomy**: History of astronomy 1-1 Model of the Solar System 1-2 Kepler's laws 1-3 Law of Gravitation and Laws of Motion 1-4 Astronomical units, light year, parsec, kilometers and parallax 1-5Escape speed 1-7 Some solved problems.
Chapter two 6th, 7th , weeks	2-1 What is the solar system? 2-2 - Origin of the solar system 2-3 Components of the solar system 2-4 The Planets 5-5 planets characteristic 2-6 bode law 2-7Albedo 5-8Types of telescope 2-9 Rotation and revolution 2-10 Some solved problems
Chapter three 8th and 9th weeks	Sun 3-1 Sun structure and solar energy 3-2 Layers of the Sun 3-3 Energy from the Sun 3-4 Electromagnetic spectrum of the sun 3-5 Sun radiation 3-6 process of production solar energy 3-7 process reaching solar energy to the earth surface 3-8 The inverse square law for intensity 3-9 Some solved problems
Chapter four 10th, 11th weeks	4-1 Family of Stars 4-2 properties of Stars 4-3 Luminosity and brightness 4-4 distance and energy 4-5 Apparent brightness (m) 4-6 Brightness 4-7some problem
Chapter five 12th, 13th weeks	The Stars Definitions 5-1 Types of Stars 5-2 Binary Stars 5-3 Stellar Properties (a-brightness b- temperature c-mass) 5-3 The H-R diagram 5-4 Mass - Luminosity Relation 5-5 brightness – temperature Relation 5-6 Stellar Lifetimes Some problems.

Chapter six 14th week	6-1Earth structure 6-2-Earth atmosphere composition of permanent gases 6-3- variable gases of atmosphere 6-4- Earth atmosphere layers 6-5- variation temperature and pressure with altitude and some solved problems.
Chapter seven 15 week	7-1 properties of moon 7-2 phase of moon 7-3 Total and partial lunar eclipse 7-4 Solar eclipse 7-5 time for lunar rise and set

Kurdistan Regional Government Iraq   Module: Astronomy
Ministry of Higher Education & Scientific Research   Stage: Third class.
Salahuddin University –Erbil   Round: First
College of Basic Education   Time: 90 minutes
Department: General Science

Q1 / Define the following: **(8 marks)**
1- Asteroids   2- Escape Speed   3- period rotation 4- Nuclear Fission

Q2/Answer the following questions: (4 marks)
1- Determine the energy of the sun according to the special theory of Albert Einstein
2- Explain inside the sun and draw the figure of them.

Q3 /If the radius of earth is 6.378×10^6 m and distance between earth and sun is equal 1.0 AU and mass of the sun is 2×10^{30} kg. where $G = 6.6726 \times 10^{-11} N\text{-}m^2/kg^2$.
Find the following:
1- Escape velocity of earth.
2- Mass of the earth.
3-Gravitationalp potential energy of the earth with respect to the sun.
4-Gravitation energy between sun and earth.   **(8 marks)**

Best wishes   Lecturer / Chiman I. Hussain   Date: 23 - 11-2022