**Ministry Of Higher Education and Scientific Research**





**Mustansiriyah University/College of Science/Dept. of Atmospheric Sciences**

**(الخطة الدراسية للمساق)**

**Course Plan**

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| **Course No.:** |  |
| **Course Name: Atmospheric Dynamics 1** | **Time Division:** |
| **Course Website: https://uomustansiriyah.edu.iq/e-learn/profile.php?id=136** | **Semester & Year:**   1 , **2018 /2019** |

**Course Description**

4 credit hours, Prerequisite [4]

The course provides an introduction to dynamics atmosphere and its applications. Also provides the equations of motion of atmosphere. Major course topics include basic dynamics (e.g., Geostrophic flow, Gradient flow, Inertial and cyclostrophic flow, Thermal wind, Circulation and Vorticity)

**Course Intended Outcomes:**

At the end of the course, students are expected to learn: the causes and nature of motion of the atmosphere on all scales. This course aims to build a fundamental set of physical principles and apply them to understanding large-scale atmospheric motions. Mathematical descriptions of the atmospheric dynamics are constructed and interpreted in terms of their physical significance.

**Course Outline:**

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| **Week** | **Topics Covered** |  |  |
| 1 | Lecture 1: Some Introductory Principles. | 2 hours | A 4/10, B 3/10 |
| 2 | Lecture 2: Fixed and rotating coordinates | 2 hours | A 11/10, B 10/10 |
| 3 | Lecture 3: Full Derivation of the Rotating Coordinates . | 2 hours | A 18/10, B 17/10 |
| 4 | Lecture 4: The Viscous Force. | 2 hours | A 25/10, B 24/10 |
| 5 | Lecture 5: The Gravitational Force. | 2 hours | A 1/11, B 31/10 |
| 6 | Lecture 6: The Centrifugal Force. | 2 hours | A 8/11, B 7/11 |
| 7 | Lecture 7: The Coriolis Force. | 2 hours | A 15/11, B 14/11 |
| 8 | First Exam | 2 hours | A 22/11, B 21/11 |
| 9 | Lecture 8: The Components of Motion Equation . | 2 hours | A 29/11, B 28/11 |
| 10 | Lecture 9: The Spherical Coordinates. | 2 hours | A 6/12, B 5/12 |
| 11 | Lecture 10: Three Additional Equations | 2 hours | A 13/12, B 12/12 |
| 12 | Lecture 11: Isothermal atmosphere | 2 hours | A 20/12, B 19/12 |
| 13 | Lecture 12: Adiabatic atmosphere | 2 hours | A 27/12, B 26/12 |
| 14 | Lecture 13: Hypsometric equation and thickness. | 2 hours | A 3/1, B 2/10 |
| 15 | Lecture 14: Second Exam | 2 hours | A 10/1, B 9/10 |

**Textbooks:**

An Introduction to Dynamic Meteorology. James R. Holton, Elsevier, 4th ed. Pp535, 2004.

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| 1. Holton, J. R., *An introduction of Dynamic Meteorology*, Elsevier Academic Press, 4th ed., 2004. |

**Suggested references:**

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| 1. *Martin, Jonathan E., Mid-Latitude Atmospheric Dynamics, John Wiley and Sons* 2. *Gill ,A.E, Atmosphere – Ocean Dynamics , Academic press, 1982.* 3. *WMO Report , Compendium of dynamic meteorology Vol:1, part:1,No:364.* |

**Marking:**

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| --- | --- | --- | --- | --- | --- | --- |
| **Course** | | | | | **Final Exam** | **Final Mark** |
| **1st exam** | **2nd exam** | **Practical** | **Activity** | **Total** |  |  |
| **12** | **12** | **0** | **6** | **30** | **70** | **100** |
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**Assignments and/ or Projects:**

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| **Assignment/ Project** | **Description** | **Due Date** | **Marking** |
| **Homework in each lecture** | **The students do the homework of the previous lecture** | **The next lecture** | **3** |
| **A report** | **A report submitted by the student on any external subject** | **At the end of the course** | **3** |

**Instructor(s) information[معلومات الأستاذ]**

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| **Section:     Atmospheric Sciences Building** | | **Lecture Room:** | **201 Office No.: 4** | |
| **Instructor's Name: L. Dr. Thaer Obaid Roomi E-Mail**: **th.roomi.atmsc@uomustansiriah.edu.iq** | | | |  |
| **Office Hours: 3** | **days : (08:30-2:30)**  **NOTES:**  **-Office Hour: Other office hours are available by appointment.**  **-The content of this syllabus not be changed during the current semester.**  **Lecturer Signature Chairman Signature** | | | |