**مختصر توصيف المقرر**

**معلومات المقرر*** **(Course Information)**

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| **اسم المقرر:** | الديناميكا الحرارية |
| **رقم المقرر:** | فيز 2412 |
| **اسم ورقم المتطلب السابق:** | فيز 1022 |
| **اسم ورقم المتطلب المرافق:** | -- |
| **مستوى المقرر:** | الثالث |
| **الساعات المعتمدة:** | 3 (3+0+0) |

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| **Module Title:** | Thermodynamics |
| **Module ID:** | PHYS 2412 |
| **Prerequisite (Co-requisite):** | PHYS 1022 |
| **Co-requisite:** | -- |
| **Course Level:** | Third |
| **Credit Hours:** | 3 (3+0+0) |

**وصف المقرر :** **Module Description**

Thermodynamics concepts and terminology, systems, properties, state, changing the state of a system, unit's systems, property units, converting units, problem solving in thermodynamics. Energy, work, and heat transfer, energy within system boundary, energy transfer. Thermodynamics properties of pure substances, state principle, intensive and extensive properties, pure substances, liquid-vapor tables, saturation and quality, compressed liquids, superheated vapor, gases, ideal gas law, other thermodynamics properties. First law of thermodynamics, closed system, open system, steady state and flow processes, transient. Reversible and irreversible processes, irreversible processes, the effect of friction, the effect of a finite temperature. Entorpy and the second law, Entropy, the second law of thermodynamics, calculating values for entropy. Second law of thermodynamics, applying the second law to general thermodynamics, application to specific devices. Analysis of thermodynamics cycles, first and second laws for cycles, power cycles, refrigeration and heat pump cycles, and second law statements revisited.

**أهداف المقرر :** **Module Aims**

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| **1** | The main purpose for this course is to introduce the main concepts in thermodynamics such as | 1 |
| **2** | System definition with thermodynamics properties | 2 |
| **3** | Heat transfer in thermodynamics systems | 3 |
| **4** | Pure substance properties Thermodynamics cycles | 4 |
| **5** | The main purpose for this course is to introduce the main concepts in thermodynamics such as | 5 |

**مخرجات التعليم:** **Learning Outcomes:**

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|---|---|---|
| **1** | Define the System and thermodynamics properties and cycles. | 1 |
| **2** | Recognize Heat transfer in thermodynamics systems | 2 |
| **3** | Apply the gained mathematical and experimental knowledge in any physical related topic. | 3 |
| **4** | Thinking and imagining about the system and universe | 4 |
| **5** | Use the mathematical equations and related work toward universe understanding. | 5 |

**Course Contents:** **محتوى المقرر:**

| ساعات التدريس (Hours) | عدد الأسابيع (Weeks) | قائمة الموضوعات (Subjects) |
|---|---|---|
| 3 | 1 | CHAPTER 1: Thermodynamics concepts and terminology, systems, properties, state, changing the state of a system, unit's systems, property units, converting units, problem solving in thermodynamics. |
| 6 | 2 | CHAPTER 2: Energy, work, and heat transfer, energy within system boundary, energy transfer.<br>CHAPTER 3: Thermodynamics properties of pure substances, state principle, intensive and extensive properties, pure substances, liquid-vapor tables, saturation and quality, compressed liquids, superheated vapor, gases, ideal gas law, other thermodynamics properties. |
| 6 | 2 | CHAPTER 4: First law of thermodynamics, closed system, open system, steady state and flow processes, transient. |
| 9 | 2 | CHAPTER 5: Reversible and irreversible processes, irreversible processes, the effect of friction, the effect of a finite temperature.<br>CHAPTER 6: Entropy and the second law, Entropy, the second law of thermodynamics, calculating values for entropy. |
| 9 | 3 | CHAPTER 7: Second law of thermodynamics, applying the second law to general thermodynamics, application to specific devices, |
| 9 | 3 | CHAPTER 8: Analysis of thermodynamics cycles, first and second laws for cycles, power |
| 3 | 1 | cycles, refrigeration and heat pump cycles, and second law statements revisited. |
| 2 | 1 | Exams |

**Textbook and References:** **الكتاب المقرر والمراجع المساندة:**

| سنة النشر Publishing Year | اسم الناشر Publisher | اسم المؤلف (رئيسي) Author's Name | اسم الكتاب المقرر Textbook title |
|---|---|---|---|
| **2006** | Wiley | Philip S. Schmidt, Ofodike A. Ezekoye, John R. Howell and Derek K. Baker | Thermodynamics |
| **سنة النشر Publishing Year** | **اسم الناشر Publisher** | **اسم المؤلف (رئيسي) Author's Name** | **اسم المرجع Reference** |

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|---|---|---|---|
| **2006** | Wiley | F.W. Sears and.G.L. Salinge, serway | Thermodynamics, kinetic theory, and statistical thermodynamics |
| 0521274567 | Cambridge University Press | C. J. Adkins | Equilibrium Thermodynamics |
| 1118131991 | Wiley | C. Borgnakke and R. E. Sonntag | Fundamentals of Thermodynamics |