

The students have to deduce:

- 1- The differential equation of vibrational motion.
- 2- The differential equation of wave motion.



## Course Description of Vibrations & Waves

- البرنامج الذي يقدم المقرر من خلاله (برنامج إعداد المعلم)
- The course is presented through the teacher preparing Programme.
- يمثل المقرر عنصرا (رئيسيا) بالنسبة للبرنامج
- This is a core course in the programme.
- القسم العلمي المسنول عن البرنامج (قسم الفيزياء والرياضيات)
- The Curriculum and Instruction Department is responsible for the programme.
- القسم العلمي المسنول عن تدريس المقرر (قسم الطبيعة)
- The physics Department is responsible for teaching the course.
- السنة الدراسية / المستوى (الفرقة الثانية – الفصل الدراسي الأول “شعبة الطبيعة” الرياضيات)
- The course is targeted to be presented for second Year for physics section students.
- تاريخ اعتماد توصيف البرنامج ( / / )
- Date of accrediting the course description ( \ \ )

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## Basic Data

## بيانات أساسية

- (1) Course Title: Vibrations & Waves
- (2) Course Code No.: 212 ph
- (3) Credit Hours: four credit hours
- Lectures: 2 credit hours
- laboratory: 2 credit hours
- Total hours: 4 credit hours

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## Professional Data

## بيانات مهنية

### 1) General goals of the course

### (1) الأهداف العامة للمقرر

The course is designed to help student-teachers achieve the following goals:

Students have to know the nature of vibrational wave motions with emphasis on their mathematical descriptions and experimental verifications.

### 2) Operational learning objectives of the course

### الأهداف الإجرائية للمقرر

By the end of this course, student teachers are expected to achieve the following objectives:

#### A) Knowledge and Comprehension:

(أ) المعرفة والفهم:

The students have to deduce:

- 1- The differential equation of vibrational motion.
- 2- The differential equation of wave motion.
- 3- the distribution of velocities and pressure in plane wave.

The students have to recognize the following :

- 1- Simple harmonic motion and their applications.
- 2- superposition of more than one S.H.M and the associated Lissajou's figures.
- 3- Free, forced and resonant vibrations. **(P.T.O).**
- 4- Wave motion characteristics, types of waves

**B) Cognitive Skills:**

**(ب) المهارات العقلية:**

- Demonstrate competence in the practice of teaching as defined within the Entry-Level Standards.
- promote the maintenance of a safe science classroom, including the appropriate use and storage of scientific equipment, and safe storage, use, and disposal of materials;

**C) Practical Skills:**

**(ج) المهارات العملية:**

- Locate resources, design and conduct inquiry-based open-ended investigations in physics, interpret findings, communicate results, and make judgments based on evidence.
- Demonstrate competence in the practice of teaching through investigative experiences and by demonstrating the application of the scientific process and assessing student learning through multiple processes.
- Acquire hands on practical skills.
- Biological and engineering applications.

**D) Enabling Skills:**

**(د) المهارات العامة والمنقولة:**

- Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of science in human affairs.
- Create and maintain an educational environment in which conceptual understanding will occur for all science students.

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## Contents

## المحتويات

| Week       | Topic                                                                                                | Assigned hours |            |       |
|------------|------------------------------------------------------------------------------------------------------|----------------|------------|-------|
|            |                                                                                                      | Lectures       | laboratory | Total |
| First      | Simple Harmonic Motion: Differential equation and graphical representation.<br>Energy of vibrations. | 2              | 2          | 4     |
| Second     | Oscillation with one and two degrees of freedom.<br>Linearity and superposition principle.           | 2              | 2          | 4     |
| Third      | Simple and compound pendulum.                                                                        | 2              | 2          | 4     |
| Fourth     | Simple harmonic oscillation of a mass between springs and of loaded spring.                          | 2              | 2          | 4     |
| Fifth      | Lissajou's figures.<br>Composition of two simple harmonic oscillations.                              | 2              | 2          | 4     |
| Sixth      | Free, forced and resonant vibration.                                                                 | 2              | 2          | 4     |
| Seventh    | Damped and un-damped vibration.                                                                      | 2              | 2          | 4     |
| Eighth     | What does propagate in wave motion?                                                                  | 2              | 2          | 4     |
| Ninth      | Characteristics of wave motion: transverse and longitudinal wave motion..                            | 2              | 2          | 4     |
| Tenth      | Differential equation of wave motion..                                                               | 2              | 2          | 4     |
| Eleventh   | Particle and wave velocities..                                                                       | 2              | 2          | 4     |
| Twelfth    | Distribution of velocities and pressure wave.                                                        | 2              | 2          | 4     |
| Thirteenth | Energy of progressive wave.                                                                          | 2              | 2          | 4     |

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### Activities, tasks and assignments:

### أساليب التعليم والتعلم

- Solves and discusses problem sets.
- Computer aided and web based assignments and assessment.
- Lecture.
- Laboratory experiments.
- Problems and essay assignments.

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### Assessment and Evaluation tools:

### أساليب التقييم

- Semester activities including classroom interactions and Quizzes.
- Mid – term exam
- Lab performance evaluation.
- Oral exam.
- Final exam

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### Summative Evaluation table

### جدول التقييم

|                   |              |                |                    |                     |                |
|-------------------|--------------|----------------|--------------------|---------------------|----------------|
| First Assessment  | Midterm exam | Seventh Week   | الأسبوع السابع     | نصف الفصل الدراسي   | التقييم الأول  |
| Second Assessment | Final exam   | Fifteenth Week | الأسبوع الخامس عشر | نهاية الفصل الدراسي | التقييم الثاني |

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### النسبة المئوية لكل تقييم

| Assessment            | وزن الدرجة Score Weight | التقييم                       |
|-----------------------|-------------------------|-------------------------------|
| 1. Midterm exam       | 12                      | 1. امتحان نصف الفصل الدراسي   |
| 2. Final written exam | 56                      | 2. امتحان نهاية الفصل الدراسي |
| 3. Final oral exam    | 12                      | 3. الامتحان الشفوي            |
| 4. assignments        | 20                      | 4. أعمال السنة                |
| Total                 | %100                    | المجموع                       |

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## **References:**

### **Students' Textbooks**

### **Lecturer's References**

### **Periodicals and websites**

## **قائمة المراجع**

### **كتب الطالب** (1)

### **كتب المحاضر** (2)

### **مجلات علمية، ومواقع الإنترنت** (3)

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## **Resources**

## **الإمكانات المطلوبة للتعليم والتعلم**

- Computer simulation programs and slides.
- Transparencies.
- Manual of solved problems (answer and solutions)
- **Text books:**
- 1- Fundamentals of optics, F.A. Jenkins and H.E White.

2- "أساسيات الضوء" ترجمة أ.د. عبدالفتاح احمد الشاذلي.

3- "light", R.w. Ditchburn.

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**Course coordinator:**

• منسق المقرر:

**Head of the Department:**

• رئيس القسم:

**Date:**

• التاريخ: