# Course Syllabus of Physics

**Faculty: Medicine and Health Sciences**
**Department: Health Sciences**
**Program: Bachelor in Clinical Nutrition and Dietetic**

| I. General information about the course instructor : | | | | | | | |
|---|---|---|---|---|---|---|---|
| Name | Dr. Abdullah Taher | Office Hours(2 Hours Weekly ) | | | | | |
| Location & phone number | UST- 715989708 | Sat | Sun | Mon | Tue | Wed | Thu |
| Email | A.taher2@ust.edu | | | | 2 | | |

| II. General information about the course: | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Course Title : | Physics | | | | |
| 2. | Course Code and Number : | BND111 | | | | |
| 3. | Credit Hours: | Theoretical | Seminar/Tutorial | Practical | Training | Total |
| | | 2 | | 1 | | 3 |
| 4. | Study Level and Semester: | 1st Year/ 1st semester | | | | |
| 5. | Pre-requisites : | None | | | | |
| 6. | Co-requisites : | None | | | | |
| 7. | Program in which the course is offered: | Bachelor in Clinical Nutrition and Dietetic | | | | |
| 8. | Teaching Language: | English | | | | |
| 9. | Instruction location: | University of Science and Technology, Sana'a, Yemen | | | | |

## III. Course Description

This course provides student with the principles of physics which related to biophysics and medical physics applications. The course topics will cover and focus on: Physical measurements and units, Physical properties of matter, energy, metabolism, radiation and medical imaging, heat and its application in medicine, light and optics Principles, laser properties and its applications, Mechanical properties of human body, Pressure and its application in human health, and electricity within the body. The teaching strategies of this course include lectures, self-learning, seminar, applied research, discussion, problems solving, and other activities to teach this course. The assessment strategies include oral presentation, written assignments, practical reports, and final written exam.

جامعة العلوم والتكنولوجيا
إدارة ضمان الجودة والاعتماد
APPROVED

عميد الكلية:
د. عبدالله المخلافي

رئيس القسم:
د. عبدالحبيب القباطي

المراجع :
ا.د. اسماعيل الشرعبي

الموصف :
د. عبدالله طاهر

## IV. Course Aims: This course aims to:-

1. Provide student the skills to demonstrate the basic physics related to Bio-medical physics concepts.
2. Learn the students to integrate various physical concepts related to human body properties.
3. Enable the students to investigate the effect of physical parameters on human health.
4. Extend students' knowledge with physics applications in medicine.

## V. Course Intended Learning Outcomes (CILOs): At the end of this course study the students will able to:-

1- Describe the biophysical properties of materials and energy.
2- State physical aspects for human body and foods materials.
3- Interpret the relations between the affecting physical factors on metabolism and controlling its behavior by using physical laws.
4- Analyze the scientific roles into human health and environment.
5- Apply physical theories solutions in human health, and safety.
6- Manage time and tasks regarding doing the assignments about course's materials in a team.

## VI. Course Contents

**Theoretical Aspect:**

| No. | Course Units | Sub-topics | Week due | Contact Hours |
|---|---|---|---|---|
| 1 | **Ch. 1 Physics fundamentals and Measurements** | Units and Dimensions, Matter and its components | 1st | 2 |
| 2 | **Ch. 2 Energy and Metabolism** | Energy, Types of energy, relation between matter and energy, Metabolism, body efficiency. | 2nd | 2 |
| 3 | **Ch. 3 Medical Radiation** | Wave properties, Sources and types of radiation, ionization, and medical Radiation. | 3rd ,4th | 4 |
| 4 | **Ch. 4 Sound and Ultrasound** | Sound wave, Hearing and the Ear, Ultrasound and its application in medicine. | 5th | 2 |
| 5 | **Ch.5 Optics and Laser** | Light properties, application of total internal reflection, Laser principles and types, Laser applications in medicine, | 6th , 7th | 4 |
| 6 | **Midterm exam** | | 8th | 2 |
| 7 | **Ch6. Heat and its applications** | Temperature, Heat energy transfer, Heat transformation Heat therapy, | 9th | 2 |



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|---|---|---|---|---|
| 8 | **Ch. 7 Mechanical properties of the Human Body** | Forces and equilibrium, Lever Hydrostatics, Viscosity, membrane and Cellular transport methods. | $10^{th}$ , $11^{th}$ | 4 |
| 9 | **Ch. 8 Pressure and its application** | Pressure–Volume Work , Stress and Strain, Biophysics of breathing, Blood Pressure and flow. | $12^{th}$ , $13^{th}$ | 4 |
| 10 | **Ch. 9 Electricity within the body** | Electricity at the Atomic Level, Electrical System of the heart, Impulses in Nerve and Muscle Cells, Electrocardiogram, Electromyography, Electroencephalogram | $14^{th}$ ,$15^{th}$ | 4 |
| 11 | **Final theoretical exam** | | $16^{th}$ | 2 |
| **Total number of weeks and hours** | | | **16** | **32** |

| **Second: Practical/Tutorial/Clinical Aspects** | | | |
|---|---|---|---|
| **No.** | **Practical/Tutorial/Clinical topics** | **Week due** | **Contact Hours** |
| 1 | Accurate measurements (Practical report). | $2^{nd}$ | 2 |
| 2 | Simple pendulum and gravity | $3^{rd}$ | 2 |
| 3 | Spiral spring + Hock's law | $4^{th}$ | 2 |
| 4 | Heat capacity | $5^{th}$ | 2 |
| 5 | liquid density +Viscosity | $6^{th}$ | 2 |
| 6 | Oscilloscope + transformer | $7^{th}$ | 2 |
| 7 | Electric current + Resistors connecting | $8^{th}$ | 2 |
| 8 | Thin lenses + Prism | $9^{th}$ | 2 |
| 9 | Forces and Translational Equilibrium | $10^{th}$ | 2 |
| 10 | Final practical exam | $11^{th}$ | 2 |
| **Total number of weeks and hours** | | **10** | **20** |

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