



# Course Specification

## (Bachelor)

|   |
|---|
| <b>Course Title:</b> Principles of Physics-2  |
| <b>Course Code:</b> 1309 Phys-3               |
| <b>Program:</b> Bachelor for Computer Science |
| <b>Department:</b> Physics                    |
| <b>College:</b> Sciences                      |
| <b>Institution:</b> King Khalid University    |
| <b>Version:</b> TP-153-2024                   |
| <b>Last Revision Date:</b> 20/01/2025         |





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## A. General information about the course:

### 1. Course Identification

|   |  |                                  |                                     |                                |                                 |
|---|--|----------------------------------|-------------------------------------|--------------------------------|---------------------------------|
| <b>1. Credit hours: (3 H )</b>  |  |                                  |                                     |                                |                                 |
| <b>3 (2+1) hrs</b>  |  |                                  |                                     |                                |                                 |
| <b>2. Course type</b>   |  |                                  |                                     |                                |                                 |
| A.  | <input checked="" type="checkbox"/> University | <input type="checkbox"/> College | <input type="checkbox"/> Department | <input type="checkbox"/> Track | <input type="checkbox"/> Others |
| B.  | <input checked="" type="checkbox"/> Required   |                                  | <input type="checkbox"/> Elective   |                                |                                 |
| <b>3. Level/year at which this course is offered: ( 2<sup>nd</sup> level/ 1<sup>st</sup> year)</b>  |  |                                  |                                     |                                |                                 |
| <b>4. Course General Description:</b>   |  |                                  |                                     |                                |                                 |
| This course focuses on Electric field and potential, Coulomb laws, electric field for point charges, Electric conductivity, electric current (Ohm's law) and electric energy, Magnets and Magnetism. light and optics, Waves and Sound.   |  |                                  |                                     |                                |                                 |
| <b>5. Pre-requirements for this course (if any):</b>  |  |                                  |                                     |                                |                                 |
| 1308Phys-3  |  |                                  |                                     |                                |                                 |
| <b>6. Co-requisites for this course (if any):</b>   |  |                                  |                                     |                                |                                 |
| None  |  |                                  |                                     |                                |                                 |
| <b>7. Course Main Objective(s):</b>   |  |                                  |                                     |                                |                                 |
| This course will introduce students to how to:  |  |                                  |                                     |                                |                                 |
| <input type="checkbox"/> Explain physical phenomena based on the general concepts of physics.<br><input type="checkbox"/> Define general principles of light, electricity and magnetism.<br><input type="checkbox"/> Solve problems in light, optics, electricity, and magnetism. |  |                                  |                                     |                                |                                 |

### 2. Teaching mode (mark all that apply)

| No | Mode of Instruction  | Contact Hours | Percentage |
|----|--|---------------|------------|
| 1  | Traditional classroom  | 2h/week       | 100%       |
| 2  | E-learning   |               |            |
| 3  | Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul> |               |            |
| 4  | Distance learning  |               |            |

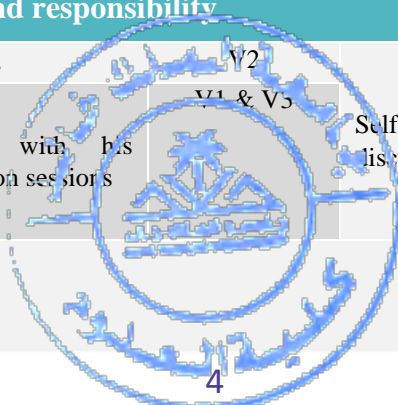


### 3. Contact Hours (based on the academic semester)

| No    | Activity          | Contact Hours |
|-------|-------------------|---------------|
| 1.    | Lectures          | 32            |
| 2.    | Laboratory/Studio | 32            |
| 3.    | Field             |               |
| 4.    | Tutorial          |               |
| 5.    | Others (specify)  |               |
| Total |                   | 64            |

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes  | Code of CLOs aligned with program | Teaching Strategies                                    | Assessment Methods  |
|------|---|-----------------------------------|--|---|
| 1.0  | Knowledge and understanding   |                                   |  |   |
| 1.1  | Explain basic scientific facts, concepts, and principles related to the optics, electricity and magnetism.    | K1                                | Lectures, electronic lectures, group discussion.       | quizzes, written exams Mini project reports Homework assignments      |
| 1.2  | Describe the applications related to electricity and magnetism.   | K2                                |  |   |
| 2.0  | Skills  |                                   |  |   |
| 2.1  | Use the laws and mathematical methods of optics, waves, electricity and magnetism to solve problems.          | S1                                | Class lectures Group discussion the internet resources | Tutorials Homework assignments. Research Assignments                  |
| 2.2  | Illustrate some physical phenomena using concepts of magnetism and electricity.                               | S2                                |  |   |
| 2.3  | Choose the suitable concepts and laws of waves, electricity and magnetism in solving and explaining problems. | S1                                |  |   |
| 3.0  | Values, autonomy, and responsibility  |                                   |  |   |
| 3.1  | Practice self-learning skills   | V2                                | Self-study Scientific discussion in group              | Explain and discover an interactive discussion continuous observation |
| 3.2  | Participate information with his colleagues during discussion sessions  | V1 & V3                           |  |   |



### C. Course Content

| No    | List of Topics  | Contact Hours |
|-------|---|---------------|
| 1.    | <b>The Electric Charge and Electric Field</b><br>Properties of electric charge, Charging objects by induction, Coulomb's Law, Electric field for point charges, Electric conductivity and electric energy.  | 6             |
| 2.    | <b>Electric Potential</b><br>Potential Difference and electric potential<br>Relation between electric field and potential,  | 4             |
| 3.    | <b>Direct Current and Resistance</b><br>Electric current, voltage, Ohm's law, resistance and resistivity, series and parallel electric circuits, equations for resistors in series and parallel circuits, electric power, Kirchhoff's circuit laws electric current (Ohm's law) | 6             |
| 4.    | <b>Magnets and Magnetism</b><br>Permanent magnet, magnetic fields around electrical conductors, magnetic field lines, magnetic force acting on a charge moving in a magnetic field, magnetic torque, density of the magnetic field, mass spectrometer,                          | 6             |
| 5.    | <b>Light and Optics</b><br>Electromagnetic spectrum, specular reflection, Snell's law, optical physics and geometric optics   | 4             |
| 6.    | <b>Waves and Sound</b><br>Transverse and longitudinal waves, sinusoidal waves (amplitude, wavelength), absorption, reflection, refraction, interference, polarization and Doppler Effect  | 6             |
| Total |   | 32            |

### Practical Work

| No    | List of Topics                          | Contact Hours |
|-------|---|---------------|
| 2.    | Electrics measurements                  | 3             |
| 2.    | Coulomb's Law                           | 3             |
| 3.    | The Electric Field Mapping              | 3             |
| 4.    | Construction of Voltmeter               | 3             |
| 5.    | Combinations of Capacitors              | 4             |
| 6.    | The charge and discharge of a capacitor | 4             |
| 7.    | Ohm's Law                               | 3             |
| 8.    | Resistors in Series and Parallel        | 3             |
| 9.    | Magnetic Field, Biot Savart Law         | 3             |
| 10.   | Standing waves                          | 3             |
| Total |   | 32            |



## D. Students Assessment Activities

| No | Assessment Activities *      | Assessment timing (in week no)            | Percentage of Total Assessment Score |
|----|------------------------------|---|--------------------------------------|
| 1. | Homework + class short exams | 5 <sup>th</sup> week                      | 5%                                   |
| 2. | Mid-Term                     | 7 <sup>th</sup> week                      | 30%                                  |
| 3. | Computerized short exams     | 6 <sup>th</sup> and 11 <sup>th</sup> week | 5%                                   |
| 4. | Lab exam                     | 16 <sup>th</sup> week                     | 20%                                  |
| 5. | Final examination            | At the end of the semester                | 40%                                  |

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

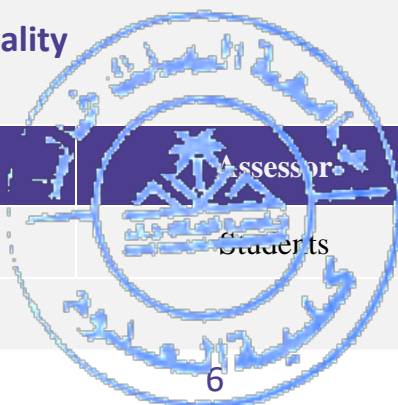
|                          |   |
|--------------------------|---|
| Essential References     | Kyle, Ph.d. Kirkland, Electricity and magnetism, 1st edition, (2007), Publisher: Facts on File. ISBN 13: 9780816061129<br>Physics for Scientists and Engineers by Raymond A. Serway and John W. Jewett. ISBN 0534408427 Thomson Brooks/Cole © 2004; 6th Edition |
| Supportive References    | Purcell E.M., Morin D.J., Electricity and Magnetism, 3ed Edition (2013), Cambridge University Press. ISBN 13:78-1-107-01402-2   |
| Electronic Materials     | Selected electronic lectures in electricity and magnetism.  |
| Other Learning Materials | No further materials are recommended  |

### 2. Required Facilities and equipment

| Items   | Resources   |
|---|---|
| <b>facilities</b><br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | <b>A classroom with its facilities that accommodates forty students</b> |
| <b>Technology equipment</b><br>(projector, smart board, software)                         | <b>Data show, laptop, smart board and internet.</b>                     |
| <b>Other equipment</b><br>(depending on the nature of the specialty)                      | -----   |

## F. Assessment of Course Quality

| Assessment Areas/Issues   | Assessor              | Assessment Methods |
|---------------------------|-----------------------|--------------------|
| Effectiveness of teaching | Assessors<br>Students | Indirect method    |





| Assessment Areas/Issues                     | Assessor                                     | Assessment Methods         |
|---|--|----------------------------|
| Effectiveness of Students assessment        | Course instructor                            | Direct method              |
| Quality of learning resources               | Students                                     | Indirect method            |
|   | Program Leaders Faculty                      | Direct and indirect method |
| The extent to which CLOs have been achieved | Course instructor<br>Program Leaders Faculty | Direct and indirect method |
| Other                                       |  |                            |

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

**Assessment Methods** (Direct, Indirect)

### G. Specification Approval

|                           |   |
|---------------------------|---|
| <b>COUNCIL /COMMITTEE</b> | Physics Department Council  |
| <b>REFERENCE NO.</b>      | The meeting No. 6 for the academic year 1446, the recommendation No. 3.6.46 |
| <b>DATE</b>               | 2/5/1446 H  |

