



Course Specification

— (Bachelor)

Course Title: **Electricity and Magnetism -2**

Course Code: **PHYS26342**

Program: **Physics**

Department: **Physics**

College: **Science**

Institution: **University of Bisha**

Version: **3**

Last Revision Date: 25 July 2023



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A. General information about the course:

1. Course Identification

| | |
|---|--|
| 1. Credit hours: | 3 |
| 2. Course type | |
| A. | University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/> |
| B. | Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: | 5 th Level / 3 rd year |
| 4. Course general Description | |
| Magnetism study topics including the magnetic fields, the Faraday's law, the inductance, the alternating-current circuits, the electromagnetic waves. | |
| 5. Pre-requirements for this course: | |
| PHYS26241 Electricity and Magnetism -1 | |
| 6. Co- requirements for this course: | |
| NA | |
| 7. Course Main Objective(s) | |
| Recognize the fundamental of the magnetism and electromagnetic waves. | |

2. Teaching mode (mark all that apply)

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



3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1. | Lectures | 45 |
| 2. | Laboratory/Studio | |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | |
| | Total | 45 |

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 | Define the magnetic force, magnetic fields, and source of magnetic fields. | K.1 | Lectures Solve problems | Written test Reports Homework Quizzes |
| 1.2 | Describe the Faraday's law and electric inductance. | K.1 | | |
| 1.3 | Define the A.C. electrical circuits. | K.1 | | |
| 1.4 | Recognize the electromagnetic waves phenomena. | K.1 | | |
| 2.0 | Skills | | | |
| 2.1 | Analyze the magnetic force, magnetic fields, and source of magnetic fields. | S.1 | Lectures Solve problems. | Written test Reports Homework Quizzes |
| 2.2 | Apply the Faraday's law and electric inductance. | S.1 | | |
| 2.3 | Solve problems related to the A.C. electrical circuits. | S.1 | | |
| 2.4 | Solve problems related to the electromagnetic waves. | S.1 | | |
| 3.0 | Values, autonomy, and responsibility | | | |
| 3.1 | Ability to self-learning independently. | V.2 | Self-learning | Reports Presentation |



C. Course Content

| No | List of Topics | Contact Hours |
|--------------|---|---------------|
| 1. | Magnetic Fields 1. Particle in a Magnetic Field. 2. Motion of a Charged Particle in a Uniform Magnetic Field. | 4.5 |
| 2. | Magnetic Fields 3. Magnetic Force Acting on a Current-Carrying Conductor. 4. Torque on a Current Loop in a Uniform Magnetic Field. | 4.5 |
| 3. | Sources of the Magnetic Field 1. The Biot–Savart Law (one Example only). 2. The Magnetic Force Between Two Parallel Conductors. 3. Ampère’s Law. | 4.5 |
| 4. | Sources of the Magnetic Field 4. The Magnetic Field of a Solenoid. 5. Gauss’s Law in Magnetism. | 4.5 |
| 5. | Faraday’s Law 1. Faraday’s Law of Induction. 2. Motional emf. 3. Lenz’s Law. 4. Generators and Motors. | 4.5 |
| 6. | Inductance 1. Self-Induction and Inductance. 2. RL Circuits. | 4.5 |
| 7. | Inductance 3. Energy in a Magnetic Field. 4. Mutual Inductance. | 4.5 |
| 8. | Alternating-Current Circuits 1. AC Sources. 2. Resistors in an AC Circuit. 3. Inductors in an AC Circuit. 4. Capacitors in an AC Circuit. | 4.5 |
| 9. | Alternating-Current Circuits 5. The RLC Series Circuit 6. Power in an AC Circuit. 7. Resonance in a Series RLC Circuit. 8. The Transformer and Power Transmission. | 4.5 |
| 10. | Electromagnetic Waves 1. Displacement Current and the General Form of Ampère’s Law. 2. Maxwell’s Equations and Hertz’s Discoveries. 3. Plane Electromagnetic Waves. | 4.5 |
| Total | | 45 |





Table: The matrix of consistency between the content and the learning outcomes of the course.

| | Course Learning Outcomes | | | | | | | | |
|----------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| | 1.1 | 1.2 | 1.3 | 1.4 | 2.1 | 2.2 | 2.3 | 2.4 | 3.1 |
| Topic 1 | √ | | | | √ | | | | √ |
| Topic 2 | √ | | | | √ | | | | √ |
| Topic 3 | √ | | | | √ | | | | √ |
| Topic 4 | √ | | | | √ | | | | √ |
| Topic 5 | | √ | | | | √ | | | √ |
| Topic 6 | | √ | | | | √ | | | √ |
| Topic 7 | | √ | | | | √ | | | √ |
| Topic 8 | | | √ | | | | √ | | √ |
| Topic 9 | | | √ | | | | √ | | √ |
| Topic 10 | | | | √ | | | | √ | √ |

D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|----|---|--------------------------------|--------------------------------------|
| 1. | Homework, quizzes, reports, and presentation. | 1: 15 | 10 % |
| 2. | First term exam | 7: 8 | 20 % |
| 3. | Second term exam | 12:13 | 20 % |
| 4. | Final exam | End of Semester | 50 % |

E. Learning Resources and Facilities

1. References and Learning Resources

| | |
|--------------------------|---|
| Essential References | Physics for Scientists and Engineers, 10th Edition, by Raymond A. Serway, John W. Jewett, BROOKS/COLE CENGAGE Learning, Boston USA, ASIN : B00E6TSR92, (2019). |
| Supportive References | Fundamentals of Physics Extended, 12th Edition, David Halliday, Robert Resnick, Jearl Walker, Wiley, 2021. |
| Electronic Materials | - Blackboard. - PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha |
| Other Learning Materials | NA |



2. Required Facilities and equipment

| Items | Resources |
|----------------------|---------------------------|
| facilities | Classrooms, Physics lab. |
| Technology equipment | Data show or smart board. |
| Other equipment | NA |

F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|--|---------------------|--|
| Extent of achievement of course learning outcomes. | Teachers, students. | Direct (Final exams), Indirect (Questionnaire). |
| Effectiveness of teaching. | Teachers, students. | Indirect (Questionnaire) |
| Effectiveness of assessment. | Teachers, students. | Indirect (Questionnaire) |
| Quality of learning resources | Teachers, students. | Indirect (Questionnaire) |
| Quality of facilities available | Teachers, students. | Indirect (Questionnaire) |
| Fairness of evaluation | Peer reviewer. | Direct (Final exams reevaluation). |

G. Specification Approval Data

| | |
|---------------------------|----------------------------|
| COUNCIL /COMMITTEE | College of Science Council |
| REFERENCE NO. | 20 |
| DATE | 17 August 2023 |

