**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit University**

**Faculty/Institute: Collage of Science**

**Scientific Department: Physics**

**Academic or Professional Program Name: Physics**

**Final Certificate Name: Bachelor of Science in Physics**

**Academic System:** Courses

**Description Preparation Date: 18/3/2025**

**File Completion Date: 18/3/2025**

**Signature:**

**Head of Department Name:** Hussein K. Mohammad

**Date:** 27/11/2023

**Signature:**

**Scientific Associate Name:**

**Date:**

**The file is checked by:**

**Department of Quality Assurance and University Performance**

27/11/2023

## 1. Program Vision

The College of Science at Tikrit University aspires to be one of the leading academic institutions in the field of physics by adopting the latest methods of higher education and promoting scientific research through its academic, research, and administrative activities. It also seeks to provide an integrated educational environment for its students and faculty, contributing to the development of their scientific and practical skills, enabling them to become effective and creative agents in serving society. This is achieved by developing modern physics applications and employing them in various fields, such as energy, advanced materials, and nanotechnology.

## 2. Program Mission

The College of Science at Tikrit University seeks to prepare and graduate distinguished scientific and research talents in the field of physics and its applied sciences, with a focus on developing scientific knowledge and promoting academic research to serve the local, regional, and international community. It also aims to train and hone students' scientific and practical skills, enhancing their innovative capabilities in line with modern technological developments, emphasizing academic and professional values, and responding to the demands of the local and international labor market in advanced physics and industrial fields.

## 3. Program Objectives

1. Embodying the vision, mission, and objectives of Tikrit University by applying the latest educational methods in physics, with a focus on quality assurance and enhancing academic and research performance.
2. Preparing highly qualified, specialized personnel capable of serving the community, while preparing for the development of advanced physics specializations that meet future needs.
3. Disseminating the culture of scientific research and innovation in the academic community by developing physical analysis skills and conducting advanced scientific research that contributes to technological development.
4. Enhancing scientific and cultural cooperation by concluding partnership agreements with similar universities and colleges locally and internationally, with the aim of exchanging expertise and achieving excellence in research, education, and modern physics applications.
5. Focusing on developing educational and ethical values among college members—students, faculty, and staff—and instilling a spirit of dedication and scientific and professional responsibility to serve the community and nation.
6. Enhancing the intellectual and cultural development of students by opening up to world -leading scientific experiments in the fields of applied physics, materials, energy, and theoretical physics.
7. Qualifying students for the labor market through practical training and developing their research and applied skills in line with modern developments in physics, engineering, and advanced technology.

## 4. Program Accreditation

None

| 5. **Other external influences** |
|---|
| None |

| 6. **Program Structure** | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **1** | **6** | | **Semester course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **none** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2024-2025 / Fourth** | | **electromagnetic theory** | **theoretical** | |
| | | | | |

| 8. Expected learning outcomes of the program | |
|---|---|
| **Knowledge** | |
| To familiarize students with the importance of electromagnetic theories in the modern era, such as Maxwell's equations in analyzing electric and magnetic fields and their impact on technological developments and modern communications. | |
| **Skills** | |
| Develop students' skills in analyzing and solving problems | |

| | |
|---|---|
| related to electric and magnetic fields, and understand the applications of electromagnetic theories in modern systems such as communications, electronics, and applied physics. | |
| | |
| **Ethics** | |
| To establish scientific rigor and critical thinking in the analysis of electromagnetic phenomena, foster creativity and innovation in the application of physical concepts, and instill a commitment to scientific and professional ethics in research and experimentation. | |
| | |

## 9. Teaching and Learning Strategies

Using a combination of theoretical and applied methods, including interactive lectures, laboratory experiments, computer simulations, and solving complex physical problems, in addition to encouraging independent research and group projects to promote a deep understanding of electromagnetic theory.

## 10. Evaluation methods

Assessment methods rely on a variety of approaches that ensure deep understanding and comprehension of electromagnetic concepts. These include: theoretical and practical exams, continuous assessment through assignments and reports, presentations, research projects, and class discussions, in addition to short tests to assess immediate comprehension and interaction with the scientific material.

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Assistant Professor Dr. | Physics | solid state | | | | |

| Professional Development |
|---|
| **Mentoring new faculty members** |
| Orientation of new faculty members |
| **Professional development of faculty members** |
| Professional development for faculty members |

## 12. Acceptance Criterion

## 13. The most important sources of information about the program

1. David J. Griffiths, "Introduction to Electrodynamics" – An essential reference for physics students, explaining electromagnetic concepts in a clear manner with solved examples.
2. John D. Jackson, "Classical Electrodynamics" – An advanced textbook covering the in-depth mathematical details of classical electromagnetism.
3. Matthew N. O. Sadiku, "Elements of Electromagnetics" – A comprehensive resource focusing on engineering applications of electromagnetism with solved problems.
4. Richard Feynman, "The Feynman Lectures on Physics - Vol. 2" – Provides an intuitive and in-depth physics explanation of electromagnetic concepts.
5. Edward M. Purcell & David J. Morin, "Electricity and Magnetism" – A Berkeley series book focusing on electricity and magnetism using an approach based on special relativity.

## 14. Program Development Plan

1. Updating the academic content

Reviewing the curriculum and incorporating the latest developments and modern applications.

2. Enhancing the practical aspect

Developing laboratories and adding simulation software such as MATLAB and COMSOL.

3. Improving teaching strategies

Implementing active learning, research projects, and interactive classes.

4. Developing assessment methods

Adopting continuous assessment through short tests and applied projects.

5. Linking the program to the labor market

Cooperating with industrial sectors to provide practical training and applied projects.

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| Fourth stage/2024-2025 | | | | • | | | | | • | | | | | • | |
| | | electromagnetic theory | Basic | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| |
|---|
| 1. Course Name: |
| electromagnetic theory |
| 2. Course Code: |
| |
| 3. Semester / Year: |
| Semester -2- |
| 4. Description Preparation Date: |
| 18/3/2025 |
| 5. Available Attendance Forms: |
| In-person only |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30 hours per semester (2 hours per week) |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Assist.Prof.Dr.Salih Y.Darweesh<br>Email: salih.younis@tu.edu.iq |

| 8. Course Objectives | |
|---|---|
| • **Gain basic knowledge of electromagnetism and scientific applications.**<br>• **Clarify the relationship between electromagn theories and practical applications.**<br>• **Expand research and analysis skills using advan tools and software.** | • .....<br>• .....<br>• ..... |

| 9. Teaching and Learning Strategies | |
|---|---|
| **Strategy** | • Using interactive lectures to explain basic concepts and practical applications.<br>• Employing computer programs and simulations to enhanc theoretical and experimental understanding.<br>• Encouraging self-learning through research projects a applied studies. |

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15 | 2 hours<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>Exam<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>2 hours<br>Exam | Providing stude with a deep understanding electromagneti concepts and th practical applications.<br>Expanding analytical and critical thinking skills t solve complex physical proble<br>Clarifying relationship between electromagneti theories modern technologies in fields engineering communication | Theory Electromagnetism | Interactive learning through lectu and scientific discussions.<br>elf-learning thro research projects advanced exercises. | Weekly, mon daily, wri and final exam |

## 11. Course Evaluation

Distribution as follows: 25 marks for monthly and daily exams for the first semester. 25 marks for monthly and daily exams for the second semester. 50 marks for the final exams for the semester.

## 12. Learning and Teaching Resources

| | |
|---|---|
| Required textbooks (curricular books, if any) | Foundation Of Electromagnetic Theory By: J R. Reitz, Frederick J. Milford & Robert W. Chris |
| Main references (sources) | Electromagnetic Fields, Parts 1 and 2<br>Fundamentals of Electromagnetic Theory, Part and 2<br>Schaum's Outline Series: Electromagnetism, Joseph Edminster, 211 |
| Recommended books and references (scientific journals, reports...) | Electromagnetic Fields, Parts 1 and 2 |
| Electronic References, Websites | 1. MIT OpenCourseWare – |

| | |
|---|---|
| | Electromagnetism<br>https://ocw.mit.edu/courses/physics/8-02x-electricity-and-magnetism-sprin 2002/<br>o Free lessons and lectures from MIT on electromagnetism.<br>2. HyperPhysics – Electromagnetism<br>http://hyperphysics.phy-astr.gsu.edu/hbase/emcon.html<br>o A simplified explanation and illustration of electromagnetic concepts.<br>3. IEEE Xplore Digital Library<br>https://ieeexplore.ieee.org/<br>o Articles and research papers electromagnetic applications. |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 01/10/2023**
**File Completion Date: 01/10/2023**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. **Other external influences** |
|---|
| nothing |

| 6. **Program Structure** | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **30** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 1** | **PHY1102** | **electricity laboratory** | **theoretical** | **practical** |
| | | | **2** | **2** |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of electricity.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to devices.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems electric scientific materials and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |
| **Skills** |

**1 - The student should devise solutions and explain some of the problems related to the sciences of physics and related devices**
**Modernity and creativity.**
**2 - The student's knowledge of the concept of theoretical and practical physics of optics and adaptation to overcome obstacles in**
**this field .**
**3 - The student will design a plan to study the vocabulary of the subject of physical in a new and accurate manner through...**
**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**
**the field.**
**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.**

Ethics

**1- Reception**
**At this level, the student shows interest in the subject of physical and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**
**2- Response**
**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**
**3- Value judgment**
**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**
**4- Value organization**
**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**
**5- Normalization or labeling with value**
**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.**

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**

**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| | | | | | | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**

**2- Introducing advanced scientific equipment into the physical electricity laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY128 | electricity laboratory | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| |
|---|
| 1. Course Name: |
| **electricity laboratory** |
| 2. Course Code: |
| **PHY1102** |
| 3. Semester / Year: |
| **First Semester** / year 1 |
| 4. Description Preparation Date: |
| : 01/ 10/ 2023 |
| 5. Available Attendance Forms: |
| Attendance Only |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30 hours per semester. 2 hours a week |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Othman khalf zidane<br>Thuraya yarb sabri<br>Maha mohammed ibrahim |
| 8. Course Objectives |
| **1- Conveying a general idea about the subject of electricity and the importance of this cours physics departments. It is done through**<br>**Teaching the subject of electricity provides students with some skills about the basics a principles of electric, electricity devices and the parts that are composed of them, know their types and shapes, how they work, and connecting their electrical circuits. Which ma students familiar with the most important topics that they may encounter in daily practical by dealing with lenses, gratings, single-wavelength sources, interference and diffraction of various types, methods of operation and their importance? In addition to teaching the stud to use highly relevant measuring devices Falling light.**<br>**2- Preparing competent and specialized staff in the field of optics and optical devices in various forms Iraq.** |
| 9. Teaching and Learning Strategies |
| **1- Educational strategy, collaborative concept planning.**<br>**2- Brainstorming education strategy.**<br>1- **Education Strategy Notes Series.** |

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| 1 | 2 hours | | Introducing the student to electrical laboratory - explain public safety. | 1- In-person and electronic lectures<br>2- Display some pictures and shapes related to the lecture on the PPT program.<br>3- Using some simulation programs to explain the lecture in more scientific and clear ways | Weekly, monthly, daily, written exams, and the end-of-yea exam. |
| 2 | 2 hours | | Introducing the student to the electrical laboratory - explaining public safety | | |
| 3 | 2 hours | | Explanation of the use of measuring devices related to electrical voltage currents – resistors | | |
| 4 | 2 hours | | Electrical resistance experiment | | |
| 5 | 2 hours | | fulfillment of Ohm's law | | |
| 6 | 2 hours | | Daily exam and discussion reports | | |
| 7 | 2 hours | | Monthly exam | | |
| 8 | 2 hours | | Connect electrical resistors in series | | |
| 9 | 2 hours | | Connect electrical resistors in paral | | |
| 10 | 2 hours | | Connecting mixed electrical resisto | | |
| 11 | 2 hours | | Discussion reports | | |
| 12 | 2 hours | | Daily exam | | |
| 13 | 2 hours | | Reviewing weekly reports with students | | |
| 14 | 2 hours | | Review all experiments before the monthly exam | | |
| 15 | 2 hours | | Monthly exam | | |

## 11. Course Evaluation

**Distribution as follows: 25 marks for monthly and daily exams and homework for the first month. 25 marks for monthly and daily exams and homework for the second month. 50 marks for final exams.**

## 12. Learning and Teaching Resources

| | |
|---|---|
| Required textbooks (curricular books, if any) | اساسيات الكهربائية والقناطسية / يحيى عبدالحميد الحاج علي, دار الكتب للنشر والطباعة,الوصل, 2000 |
| Main references (sources) | 1990."الكهربائية والمغناطيسية"د.طالب ناهي الخفاجي, |
| Recommended books and references (scientific journals, reports...) | **1-William H. Hayt,"Engineering lectromagnatics"6th edition, 2001.**<br>**2-R.A.Serway,J.W.Jewett,"physics for Scintists and Engineering,6th edition, Thomson Books,2004.**<br>**3.David Halliday and Robert Resnick, physics part 1&part 2,3rd edition,1978** |
| Electronic References, Websites | **Iraqi virtual electronic library,**<br>**Sources of physical electric from the Internet** |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 01/10/2023**
**File Completion Date: 01/10/2023**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. **Other external influences** |
|---|
| nothing |

| 6. **Program Structure** | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **30** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 1** | **PHY128** | **Magnetism laboratory** | **theoretical** | **practical** |
| | | | **2** | **2** |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of electricity and Magnetism.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to devices.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems electric scientific materials and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |
| **Skills** |

**1 - The student should devise solutions and explain some of the problems related to the sciences of physics and related devices**
**Modernity and creativity.**
**2 - The student's knowledge of the concept of theoretical and practical physics of optics and adaptation to overcome obstacles in**
**this field .**
**3 - The student will design a plan to study the vocabulary of the subject of physical in a new and accurate manner through...**
**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**
**the field.**
**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.**

Ethics

**1- Reception**
**At this level, the student shows interest in the subject of physical and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**
**2- Response**
**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**
**3- Value judgment**
**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**
**4- Value organization**
**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**
**5- Normalization or labeling with value**
**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.**

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**

**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| | | | | | | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**

**2- Introducing advanced scientific equipment into the physical electricity laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY128 | Magnetism laboratory | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| |
|---|
| 1. Course Name: |
| **Magnetism laboratory** |
| 2. Course Code: |
| **PHY128** |
| 3. Semester / Year: |
| **First Semester** / year 1 |
| 4. Description Preparation Date: |
| : 01/ 10/ 2023 |
| 5. Available Attendance Forms: |
| Attendance Only |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30 hours per semester. 2 hours a week |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Othman khalf zidane<br>Thuraya yarb sabri<br>Maha mohammed ibrahim |
| 8. Course Objectives |
| **1- Conveying a general idea about the subject of electricity and the importance of this cours physics departments. It is done through**<br>**Teaching the subject of electricity provides students with some skills about the basics a principles of electric, electricity devices and the parts that are composed of them, know their types and shapes, how they work, and connecting their electrical circuits. Which ma students familiar with the most important topics that they may encounter in daily practical by dealing with lenses, gratings, single-wavelength sources, interference and diffraction of various types, methods of operation and their importance? In addition to teaching the stud to use highly relevant measuring devices Falling light.**<br>**2- Preparing competent and specialized staff in the field of optics and optical devices in various forms Iraq.** |
| 9. Teaching and Learning Strategies |
| **1- Educational strategy, collaborative concept planning.**<br>**2- Brainstorming education strategy.**<br>1- **Education Strategy Notes Series.** |

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| 1 | 2 hours | | Introducing the student to the Magnetism laboratory - explaining public safety | 1- In-person and electroni lectures 2- Display some pictures and shapes related to the lecture on the PPT program. 3- Using some simulation programs to explain the lecture in more scientific and clear wa | Weekly, monthly, daily, written exams, and the end-of-yea exam. |
| 2 | 2 hours | | Explanation of the graphs and the important units in the graph and the scale of the graph | | |
| 3 | 2 hours | | Explanation of the use of measuring devices related to electrical voltage - currents – resistors | | |
| 4 | 2 hours | | Metric bridge experiment | | |
| 5 | 2 hours | | Achieve discharge of a charged capacitor and calculate its time const | | |
| 6 | 2 hours | | Daily exam and discussion reports | | |
| 7 | 2 hours | | Monthly exam | | |
| 8 | 2 hours | | find the self-inductance of a coil with AC voltage source | | |
| 9 | 2 hours | | Find the capacitive reactance of a capacitor in the presence of an AC voltage source | | |
| 10 | 2 hours | | Series Resonanace circuits | | |
| 11 | 2 hours | | Discussion reports | | |
| 12 | 2 hours | | Daily exam | | |
| 13 | 2hours | | Reviewing weekly reports with stude | | |
| 14 | 2 hours | | Review all experiments before the monthly exam | | |
| 15 | 2 hours | | Monthly exam | | |

## 11. Course Evaluation

**Distribution as follows: 25 marks for monthly and daily exams and homework for the first month. 25 marks for monthly and daily exams and homework for the second month. 50 marks for final exams.**

| 12. Learning and Teaching Resources | |
|---|---|
| Required textbooks (curricular books, if any) | اساسيات الكهربائية والقناطسية / يحيى عبدالحميد الحاج علي, دار الكتب للنشر والطباعة,الوصل, 2000 |
| Main references (sources) | 1990."الكهربائية والمغناطيسية"د.طالب ناهي الخفاجي, |
| Recommended books and references (scientific journals, reports...) | **1-William H. Hayt,"Engineering lectromagnatics"6th edition, 2001.**<br>**2-R.A.Serway,J.W.Jewett,"physics for Scintists and Engineering,6th edition, Thomson Books,2004.**<br>**3.David Halliday and Robert Resnick, physics part 1&part 2,3rd edition,1978** |
| Electronic References, Websites | **Iraqi virtual electronic library,**<br>**Sources of physical electric from the Internet** |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 01/10/2023**
**File Completion Date: 01/10/2023**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **30** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 3** | **PHY314** | **Physical optics** | **theoretical** | **practical** |
| | | | **2** | **2** |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of physical optics.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to optical devices.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Optical scientific materials and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

| Skills |
| --- |
| **1 - The student should devise solutions and explain some of the problems related to the sciences of optics and related devices**<br>**Modernity and creativity.**<br>**2 - The student's knowledge of the concept of theoretical and practical physics of optics and adaptation to overcome obstacles in**<br>**this field .**<br>**3 - The student will design a plan to study the vocabulary of the subject of physical optics in a new and accurate manner through...**<br>**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**<br>**the field.**<br>**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.** |
| **Ethics** |
| **1- Reception**<br>**At this level, the student shows interest in the subject of physical optics and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**<br>**2- Response**<br>**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**<br>**3- Value judgment**<br>**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**<br>**4- Value organization**<br>**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**<br>**5- Normalization or labeling with value**<br>**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.** |

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Lecturer | Physics | Laser | | | Staff | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

البصريات الفيزيائية لطلبة الصفوف الثالثة فيزياء الدكتور : حسن محمود جواد
الشربتي
الدكتور : بتول حميد فرج الخياط الدكتور
: صبحي كمال حسون كلية التربية –
جامعة بغداد

**1- Physics of Light and Optics**
**Justin Peatross**
**MichaelWare**
**Brigham Young University**
**2015 Edition**
**May 8, 2023 Revision**

**1- Jenkins and White-Fundamentals Of Optics, Physics Book 90**

**3- FUNDAMENTALS**
**OF OPTICS FourthEdition**
**Francis A. Jenkins**
**Late Professor of Physics**
**University of California, Berkeley**
**Harvey E. White**

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY314 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| |
|---|
| 1. Course Name: |
| **Physical optics** |
| 2. Course Code: |
| **PHY314** |
| 3. Semester / Year: |
| **First Semester** / year 3 |
| 4. Description Preparation Date: |
| : 01/ 10/ 2023 |
| 5. Available Attendance Forms: |
| Attendance Only |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30 hours per semester. 2 hours a week |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Dr. Faleh Lafta Mater Al-Jashaam<br>Email: Faleh.l.mater@tu.edu.iq |
| 8. Course Objectives |
| **1- Conveying a general idea about the subject of physical optics and the importance of t course to physics departments. It is done through**<br>**Teaching the subject of physical optics provides students with some skills about the basics a principles of optics, optical devices and the parts that are composed of them, knowing th types and shapes, how they work, and connecting their electrical circuits. Which ma students familiar with the most important topics that they may encounter in daily practical by dealing with lenses, gratings, single-wavelength sources, interference and diffraction of various types, methods of operation and their importance? In addition to teaching the stud to use highly relevant measuring devices Falling light.**<br>**2- Preparing competent and specialized staff in the field of optics and optical devices in various forms Iraq.** |
| 9. Teaching and Learning Strategies |
| **1- Educational strategy, collaborative concept planning.**<br>**2- Brainstorming education strategy.**<br>2- **Education Strategy Notes Series.** |

| 10. Course Structure | | | | | |
|---|---|---|---|---|---|
| **Week** | **Hours** | **Required Learning Outcomes** | **Unit or subject name** | **Learning method** | **Evaluation method** |
| 1 | 2 hours | Propagation of light, opt phenomena and the natu of light | | 1- In-person and electronic lectures<br>2- Display some pictures and shapes related to the lecture on the PPT program.<br>3- Using some simulation programs to explain the lecture in more scientific and clear ways | Weekly, monthly, daily, written exams, and the end-of-year exam. |
| 2 | 2 hours | Phase speed and group speed | | | |
| 3 | 2 hours | Doppler phenomenon | | | |
| 4 | 2 hours | Michaelson and Morley | | | |
| 5 | 2 hours | The directional nature o light, meaning polarization | | | |
| 6 | 2 hours | Polarization and types | | | |
| 7 | 2 hours | Polarization by refractio polarization<br>By double refraction | | | |
| | 2 hours | **First month exam** | | | |
| 8 | | Polarization representat of the Jones matrix | | | |
| 9 | 2 hours | Polarization angle and Brewster's law | | | |
| 10 | 2 hours | Mals law | | | |
| 11 | 2 hours | Reflection and refraction from a plane separator | | | |
| 12 | 2 hours | Amplitudes of reflected waves | | | |
| 13 | 2 hours | The refractor and Verne equations | | | |
| 14 | 2 hours | Brewster angle based on Fresnel equations | | | |
| 15 | 2 hours | Phase change and intern reflection | | | |
| | | **Second month exam** | | | |

## 11. Course Evaluation

**Distribution as follows: 25 marks for monthly and daily exams and homework for the first month. 25 marks for monthly and daily exams and homework for the second month. 50 marks for final exams.**

## 12. Learning and Teaching Resources

| | |
|---|---|
| Required textbooks (curricular books, if any) | البصريات الفيزيائية لطلبة الصفوف الثالثة فيزياء الدكتور : حسن محمود جواد الشربتي<br>الدكتور : بتول حميد فرج الخياط الدكتور : صبحي كمال حسون<br>كلية التربية – جامعة بغداد |
| Main references (sources) | **1- Physics of Light and Optics**<br>**Justin Peatross**<br>**MichaelWare**<br>**Brigham Young University**<br>**2015 Edition**<br>**May 8, 2023 Revision** |
| Recommended books and references (scientific journals, reports...) | **3- FUNDAMENTALS OF OPTICS FourthEdition**<br>**Francis A. Jenkins**<br>**Late Professor of Physics**<br>**University of California, Berkeley**<br><br>**Harvey E. White** |
| Electronic References, Websites | **Iraqi virtual electronic library,**<br>**Sources of physical optics from the Internet** |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: Second Semester**
**Description Preparation Date: 01/02/2024**
**File Completion Date: 01/02/2024**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **30** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 3** | **PHY324** | **Physical optics** | **theoretical** | **practical** |
| | | | **2** | **2** |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of physical optics.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to optical devices.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Optical scientific materials and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

| Skills |
| --- |
| **1 - The student should devise solutions and explain some of the problems related to the sciences of optics and related devices**<br>**Modernity and creativity.**<br>**2 - The student's knowledge of the concept of theoretical and practical physics of optics and adaptation to overcome obstacles in**<br>**this field .**<br>**3 - The student will design a plan to study the vocabulary of the subject of physical optics in a new and accurate manner through...**<br>**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**<br>**the field.**<br>**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.** |
| **Ethics** |
| **1- Reception**<br>**At this level, the student shows interest in the subject of physical optics and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**<br>**2- Response**<br>**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**<br>**3- Value judgment**<br>**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**<br>**4- Value organization**<br>**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**<br>**5- Normalization or labeling with value**<br>**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.** |

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Lecturer | Physics | Laser | | | Staff | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

البصريات الفيزيائية لطلبة الصفوف الثالثة فيزياء الدكتور : حسن محمود جواد
الشربتي
الدكتور : بتول حميد فرج الخياط الدكتور
: صبحي كمال حسون كلية التربية –
جامعة بغداد

**1- Physics of Light and Optics**
**Justin Peatross**
**MichaelWare**
**Brigham Young University**
**2015 Edition**
**May 8, 2023 Revision**

**1- Jenkins and White-Fundamentals Of Optics, Physics Book 90**

**3- FUNDAMENTALS**
**OF OPTICS FourthEdition**
**Francis A. Jenkins**
**Late Professor of Physics**
**University of California, Berkeley**
**Harvey E. White**

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY324 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| |
|---|
| 1. Course Name: |
| **Physical optics** |
| 2. Course Code: |
| **PHY324** |
| 3. Semester / Year: |
| **Second Semester** / year 3 |
| 4. Description Preparation Date: |
| : 01/ 02/ 2024 |
| 5. Available Attendance Forms: |
| Attendance Only |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30 hours per semester. 2 hours a week |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Dr. Faleh Lafta Mater Al-Jashaam<br>Email: Faleh.l.mater@tu.edu.iq |
| 8. Course Objectives |
| **1- Conveying a general idea about the subject of physical optics and the importance of t course to physics departments. It is done through**<br>**Teaching the subject of physical optics provides students with some skills about the basics a principles of optics, optical devices and the parts that are composed of them, knowing th types and shapes, how they work, and connecting their electrical circuits. Which ma students familiar with the most important topics that they may encounter in daily practical by dealing with lenses, gratings, single-wavelength sources, interference and diffraction of various types, methods of operation and their importance? In addition to teaching the stud to use highly relevant measuring devices Falling light.**<br>**2- Preparing competent and specialized staff in the field of optics and optical devices in various forms Iraq.** |
| 9. Teaching and Learning Strategies |
| **1- Educational strategy, collaborative concept planning.**<br>**2- Brainstorming education strategy.**<br>2- **Education Strategy Notes Series.** |

| 10. Course Structure | | | | | |
|---|---|---|---|---|---|
| **Week** | **Hours** | **Required Learning Outcomes** | **Unit or subject name** | **Learning method** | **Evaluation method** |
| **1** | **2 hours** | Coherence and interference/principle of internal superposition | | **1- In-person and electronic lectures 2- Display some pictures and shapes related to the lecture on the PPT program. 3- Using some simulation programs to explain the lecture in more scientific and clear ways** | **Weekly, monthly, daily, written exams, and the end-of-year exam.** |
| | **2 hours** | Yong/Michaelson | | | |
| **2** | **2 hours** | interference experime Partial Coherence theory | | | |
| **3** | **2 hours** | Spectroscopy Fouriertransform spectroscopy | | | |
| **4** | **2 hours** | Fabry-Perot interferometer | | | |
| | **2 hours** | Membranes reflectivity | | | |
| **5** | **2 hours** | Fraunhofer diffraction/single slit/slot diffraction | | | |
| **6** | | Circular | | | |
| | **2 hours** | **<u>First month Exam</u>** | | | |
| **7** | **2 hours** | Similarity interference/principle internal superposition | | | |
| **8** | **2 hours** | Membranes reflectivity | | | |
| | **2 hours** | Fraunhofer | | | |
| **9** | | diffraction/single slit/slot diffraction Circular | | | |
| **10** | **2 hours** | Diffraction grating Fernel diffraction | | | |
| **11** | **2 hours** | Spectroscopy Fourier transfo spectroscopy | | | |
| **12** | | Emissivity | | | |
| | **2 hours** | absorbance | | | |
| **13** | | The propagation of li through conduct media | | | |
| **14** | **2 hours** | Nonlinear optics | | | |
| **15** | | **<u>Second month exam</u>** | | | |

## 11. Course Evaluation

**Distribution as follows: 25 marks for monthly and daily exams and homework for the first month. 25 marks for monthly and daily exams and homework for the second month. 50 marks for final exams.**

## 12. Learning and Teaching Resources

| | |
|---|---|
| Required textbooks (curricular books, if any) | **البصريات الفيزيائية لطلبة الصفوف الثالثة فيزياء الدكتور : حسن محمود جواد الشربتي**<br>**الدكتور : بتول حميد فرج الخياط الدكتور : صبحي كمال حسون**<br>**كلية التربية – جامعة بغداد** |
| Main references (sources) | **1- Physics of Light and Optics**<br>**Justin Peatross**<br>**MichaelWare**<br>**Brigham Young University**<br>**2015 Edition**<br>**May 8, 2023 Revision** |
| Recommended books and references (scientific journals, reports...) | **3- FUNDAMENTALS OF OPTICS FourthEdition**<br>**Francis A. Jenkins**<br>**Late Professor of Physics**<br>**University of California, Berkeley**<br><br>**Harvey E. White** |
| Electronic References, Websites | **Iraqi virtual electronic library,**<br>**Sources of physical optics from the Internet** |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 01/10/2023**
**File Completion Date: 01/10/2023**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **40** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 3** | PHY 213 | **Analysis Mechanics** | **theoretical** | |
| | | | **2** | |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of Analysis Mechanics.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to Mechanics devices.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Mechanics scientific materials and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

| Skills |
| --- |
| **1 - The student should devise solutions and explain some of the problems related to the sciences of Analysis Mechanics and related devices**<br>**Modernity and creativity.**<br>**2 - The student's knowledge of the concept of theoretical physics of optics and adaptation to overcome obstacles in**<br>**this field .**<br>**3 - The student will design a plan to study the vocabulary of the subject of physical Analysis Mechanics in a new and accurate manner through...**<br>**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**<br>**the field.**<br>**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.** |
| Ethics |
| **1- Reception**<br>**At this level, the student shows interest in the subject of physical Analysis Mechanics and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**<br>**2- Response**<br>**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**<br>**3- Value judgment**<br>**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**<br>**4- Value organization**<br>**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**<br>**5- Normalization or labeling with value**<br>**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.** |

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| **Prof.** | **Physics** | **Analysis Mechanics** | | | **Staff** | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

1) الميكانيك التحليلي تاليف كرانت ر. فاولس – جامعة يوتا – ترجمة طالب ناهي الخفاجي
2) Grant R. Fowles – second Edition – 1970
3) Thornton S.T. and Marion J.B. (2003), Classical Dynamics of Particles and Systems (5th edition), Tomson, ISBN 0-534-40896-6 (UL: 531.11MAR)

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY314 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form Analysis Mechanics

| Module Information<br>معلومات المادة الدراسية | | | |
|---|---|---|---|
| PHY 213 | الميكانيك التحليلي<br>Analysis Mechanics | | **UGII** |
| **Module Level** | Three | **Semester (s) offered** | I |
| **Administering Department** | **Physics** | **College** | Science |
| **Module Leader** | Dr. Abdulsamee Fawzi Abdul Aziz | **e-mail** | Abdulsamee_fawzi@tu.edu.iq |
| **Module Leader's Acad. Title** | Lecture | **Module Leader's Qualification** | Ph.D. |

| Module Aims, Learning Outcomes, Indicative Contents and Brief Description<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | Our interest in mechanics arises from its general applicability to a vast number of familiar phenomena. This module provides meaningful and easily visualizable problems which allow development of the skills of problem solving, required in all the fields of physics. It provides the necessary background to later modules that will apply the principles of mechanics to the solution of more complex problems. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | A student who has passed this module should be able to:<br>Module Specific Skills and Knowledge:recognise and describe the forces that are relevant in a given mechanics situation;<br>describe the origin of and relationship between these forces, and to describe what their consequences will be;<br>solve a range of mechanics problems as defined by the syllabus below, and by examples given in the lectures and worksheets; |
| **Course Description** | describe the origin of and relationship between these forces, and to describe what their consequences will be;<br>solve a range of mechanics problems as defined by the syllabus below, and by examples given in the lectures and worksheets;<br>Discipline Specific Skills and Knowledge:<br>apply general problem-solving strategies not only to mechanics but also to the solution of other physics problems;<br>demonstrate a knowledge of mechanics that will be applicable in a range of other physics modules;<br>use vector notation consistently and correctly as an integral part of solving problems;<br>use symbols that represent the numerical value and units of the physical quantities, and manipulate/evaluate expressions involving such symbols in |

| | |
|---|---|
| | a precise and consistent manner;<br>Personal and Key Transferable / Employment Skills and Knowledge:<br>undertake guided self-study successfully;<br>develop appropriate time-management strategies and meet deadlines for completion of work. |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | 1- Develop methods and means of obtaining information related to Magnetoelectric<br>2- Developing the student's personality to become a constructive personality that possesses scientific dialogue.<br>3- Encourage students to request information from websites and libraries. |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Domain of applicability of Newtons laws – Newtons laws – Types of forces |
| **Week 2** | Applications :- Motion of a single state Rocket – system of pulleys |
| **Week 3** | Conservation laws, elementary rotational motion – Angular momentum |
| **Week 4** | Energy and power – From dynamics to statics |
| **Week 5** | Rigid body rotation – Rolling without slipping – illustrative problems |
| **Week 6** | Illustrations of netwtons laws – Free fall of a balloon in a resistive medium |
| **Week 7** | First Exam. |
| **Week 8** | Rotating sphere – Gravitational potential inside a spherical shell |
| **Week 9** | Holonomic constraints – Non holonomic constraints – degrees of freedom |
| **Week 10** | Virtual work – D Alembert,s principle – Illustrative problem |
| **Week 11** | Velocity dependent potentials – velocity dependent potentials –Dissipative force |
| **Week 12** | Kinetic energy – illustrative problems – Charaged particle in uniform magnetic field |
| **Week 13** | Variational principle of mechanics :- Calculus of variation – one dimensional problem brachistocrone problem – problems. |
| **Week 14** | Motion in central potential – general properties – properties of conic section – Apses and A psidal distances – problems. |
| **Week 15** | Second Exam. |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** |
|---|---|
| **Required Texts** | 3) الميكانيك التحليلي تاليف كرانت ر. فاولس – جامعة يوتا – ترجمة طالب ناهي الخفاجي<br>4) Grant R. Fowles – second Edition – 1970<br>5) Thornton S.T. and Marion J.B. (2003), Classical Dynamics of |

| | |
|---|---|
| | Particles and Systems (5th edition), Tomson, ISBN 0-534-40896-6 (UL: 531.11MAR) |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: Second Semester**
**Description Preparation Date: 01/2/2024**
**File Completion Date: 01/2/2024**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **40** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 3** | PHY 223 | **Application of analysis Mechanics** | **theoretical** | **practical** |
| | | | **2** | |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of Application of analysis Mechanics.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to Application of analysis Mechanics**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Application of analysis Mechanics and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

## Skills

**1 - The student should devise solutions and explain some of the problems related to the sciences of Application of analysis Mechanics**
**Modernity and creativity.**
**2 - The student's knowledge of the concept of theoretical and practical physics of Application of analysis Mechanics in**
**this field .**
**3 - The student will design a plan to study the vocabulary of the subject of Application of analysis Mechanics in a new and accurate manner through...**
**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**
**the field.**
**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.**

## Ethics

**1- Reception**
**At this level, the student shows interest in the subject of Application of analysis Mechanics and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**
**2- Response**
**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**
**3- Value judgment**
**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**
**4- Value organization**
**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**
**5- Normalization or labeling with value**
**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.**

# 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Lecturer | Physics | Application of analysis Mechanics | | | Staff | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

1) الميكانيك التحليلي تاليف كرانت ر. فاولس – جامعة يوتا – ترجمة طالب ناهي الخفاجي
2) Grant R. Fowles – second Edition – 1970
Thornton S.T. and Marion J.B. (2003), Classical Dynamics of Particles and Systems (5th edition), Tomson, ISBN 0-534-40896-6 (UL: 531.11MAR)

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY314 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| Module Information<br>معلومات المادة الدراسية | | | |
|---|---|---|---|
| PHY 223 | تطبيقات الميكانيك التحليلي<br>**Applications of Analysis Mechanics** | | **UGII** |
| **Module Level** | Four | **Semester (s) offered** | I |
| **Administering Department** | **Physics** | **College** | Science |
| **Module Leader** | Dr. Abdulsamee Fawzi Abdul Aziz | **e-mail** | Abdulsamee_fawzi@tu.edu.iq |
| **Module Leader's Acad. Title** | Lecture | **Module Leader's Qualification** | Ph.D. |

## Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

| | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | Our interest in mechanics arises from its general applicability to a vast number of familiar phenomena. This module provides meaningful and easily visualizable problems which allow development of the skills of problem solving, required in all the fields of physics. It provides the necessary background to later modules that will apply the principles of mechanics to the solution of more complex problems. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | A student who has passed this module should be able to:<br>Module Specific Skills and Knowledge:recognise and describe the forces that are relevant in a given mechanics situation;<br>describe the origin of and relationship between these forces, and to describe what their consequences will be;<br>solve a range of mechanics problems as defined by the syllabus below, and by examples given in the lectures and worksheets; |
| **Course Description** | describe the origin of and relationship between these forces, and to describe what their consequences will be;<br>solve a range of mechanics problems as defined by the syllabus below, and by examples given in the lectures and worksheets;<br>Discipline Specific Skills and Knowledge:<br>apply general problem-solving strategies not only to mechanics but also to the solution of other physics problems;<br>demonstrate a knowledge of mechanics that will be applicable in a range of other physics modules;<br>use vector notation consistently and correctly as an integral part of solving |

| | |
|---|---|
| | problems;<br>use symbols that represent the numerical value and units of the physical quantities, and manipulate/evaluate expressions involving such symbols in a precise and consistent manner;<br>Personal and Key Transferable / Employment Skills and Knowledge:<br>undertake guided self-study successfully;<br>develop appropriate time-management strategies and meet deadlines for completion of work. |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | 1- Develop methods and means of obtaining information related to Magnetoelectric<br>2- Developing the student's personality to become a constructive personality that possesses scientific dialogue.<br>3- Encourage students to request information from websites and libraries. |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Domain of applicability of Newtons laws – Newtons laws – Types of forces |
| **Week 2** | Applications :- Motion of a single state Rocket – system of pulleys |
| **Week 3** | Conservation laws, elementary rotational motion – Angular momentum |
| **Week 4** | Energy and power – From dynamics to statics |
| **Week 5** | Rigid body rotation – Rolling without slipping – illustrative problems |
| **Week 6** | Illustrations of netwtons laws – Free fall of a balloon in a resistive medium |
| **Week 7** | First Exam. |
| **Week 8** | Rotating sphere – Gravitational potential inside a spherical shell |
| **Week 9** | Holonomic constraints – Non holonomic constraints – degrees of freedom |
| **Week 10** | Virtual work – D Alembert,s principle – Illustrative problem |
| **Week 11** | Velocity dependent potentials – velocity dependent potentials –Dissipative force |
| **Week 12** | Kinetic energy – illustrative problems – Charaged particle in uniform magnetic field |
| **Week 13** | Variational principle of mechanics :- Calculus of variation – one dimensional problem brachistocrone problem – problems. |
| **Week 14** | Motion in central potential – general properties – properties of conic section – Apses and A psidal distances – problems. |
| **Week 15** | Second Exam. |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | |
|---|---|
| | **Text** |
| **Required Texts** | 3) الميكانيك التحليلي تاليف كرانت ر. فاولس – جامعة يوتا – ترجمة طالب ناهي الخفاجي |

| | |
|---|---|
| | 4) Grant R. Fowles – second Edition – 1970<br>5) Thornton S.T. and Marion J.B. (2003), Classical Dynamics of Particles and Systems (5th edition), Tomson, ISBN 0-534-40896-6 (UL: 531.11MAR) |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 1/2/2024**
**File Completion Date:1/2/2024**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **40** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 4** | PHY 423 | **Electromagnetic fields** | **theoretical** | **practical** |
| | | | **2** | |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of Electromagnetic fields.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components related to Electromagnetic fields.**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Electromagnetic fields and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

| |
|---|
| **Skills** |
| **1 - The student should devise solutions and explain some of the problems related to the sciences of Electromagnetic fields and related devices**<br>**Modernity and creativity.**<br>**2 - The student's knowledge of the concept of theoretical physics of Electromagnetic fields and adaptation to overcome obstacles in**<br>**this field .**<br>**3 - The student will design a plan to study the vocabulary of the subject of Electromagnetic fields in a new and accurate manner through...**<br>**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way**<br>**the field.**<br>**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.** |
| **Ethics** |
| **1- Reception**<br>**At this level, the student shows interest in the subject Electromagnetic fields and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**<br>**2- Response**<br>**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**<br>**3- Value judgment**<br>**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**<br>**4- Value organization**<br>**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**<br>**5- Normalization or labeling with value**<br>**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.** |

## 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Lecturer | Physics | Electromagnetic fields | | | Staff | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

Griffiths D.J. (2014), Introduction to Electrodynamics (4th edition), Pearson Education, ISBN 978-0-321-85656-2 (UL: 537.6 GRI)
Supplementary texts:

Good R.H. (1999), Classical Electromagnetism, Saunders College Publishing, ISBN 0-03-022353-9 (UL: 537 GOO)
Lorrain P., Corson D.R. and Lorrain F. (1987), Electromagnetic Fields and Waves (3rd edition), Freeman, ISBN 0-716-71869-3 (UL: 530.141 LOR)
Reitz J.R., Milford F.J. and Christy R.W. (1993), Foundations of Electromagnetic Theory (4th edition), Addison-Wesley, ISBN 0-201-52624-7 (UL: 530.141 REI)

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY314 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| Module Information<br>معلومات المادة الدراسية | | | |
|---|---|---|---|
| PHY 423 | المجالات الكهرومغناطيسية<br>Magnetoelectric fields | | **UGIV** |
| **Module Level** | Eight | **Semester (s) offered** | I |
| **Administering Department** | **Physics** | **College** | Science |
| **Module Leader** | Dr. Abdulsamee Fawzi Abdul Aziz | **e-mail** | Abdulsamee_fawzi@tu.edu.iq |
| **Module Leader's Acad. Title** | Professor | **Module Leader's Qualification** | Ph.D. |

| Module Aims, Learning Outcomes, Indicative Contents and Brief Description<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | The magnetoelectric Fields is one of the fundamental building-blocks of Physics. It affects profoundly the way we think about the universe and is the basis for much of condensed-matter, nuclear and statistical physics. It also has a strong influence on technological developments, for instance in optical and electronic devices. This module aims to give students a firm grounding in the subject and to prepare them for future modules such as Nuclear and High-Energy Particle Physics. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | describe the definition and interpretation of the Magnetoelectric theories and of application in Magnetoelectric fileds<br>;<br>describe the general properties of the stationary states of quantum particles confined to simple symmetric potentials;<br>perform calculations on wavefunctions, and solve the Schrödinger equation for a range of problems; |
| **Course Description** | This module surveys the phenomena associated with electrostatics (charges at rest) and magnetostatics (the magnetic effects associated with steady currents). It introduces and develops the use of the electric and magnetic field vectors and relates them by considering electromagnetic induction at a classical level. The connection between these fields and conventional lumped-circuit parameters R, C and L is also developed.<br><br>This module relies on, and develops, student's ability to apply vector analysis. Maxwell's equations in differential form will be developed systematically, starting from the force between two charged particles, thereby building a firm foundation for the study of more advanced material |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | define the fields commonly used in electromagnetism, and state the laws these fields obey; |

| | |
|---|---|
| | describe the vector nature of the electric field and its relation to a scalar potential;<br>calculate the electric field due to static charges and charge distributions, using Coulomb's law or Gauss's law as appropriate and to relate this to the electrostatic energy of the system;<br>describe the vector nature of a static magnetic field and its relation to a vector potential;<br>calculate the magnetic fields, using the Biot-Savart law or Ampère's law as appropriate for circuits and steady current distributions;<br>calculate the electric and/or magnetic forces acting on quasistatic systems;<br>state the differential and integral forms of the vector laws of electromagnetism and use them to solve a range of problems;<br>relate the electric and magnetic field vectors in circumstances where Faraday's law is valid, solve related problems, give examples of practical applications;<br>relate the circuit parameters to the fields and the energy of those fields;<br>know the features of transient response for circuit parameters in simple circuits;<br>state Maxwell's equations and explain how they can be related to the force between two particles;<br>use vector analysis to apply Maxwell's equations and solve standard problems; |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Magnetic fields – magnetic forces – Lorentz force law - – illustrative examples |
| **Week 2** | The Biot- Savart law – Steady currents – The magnetic fields of a steady current– illustrative examples |
| **Week 3** | Applications of Biot – savart law. |
| **Week 4** | The divergence and curl of magnetic field – straight – line currents - – illustrative examples . |
| **Week 5** | Applications of Amperes law – comparison of magneto statics and electrostatics illustrative examples. |
| **Week 6** | Magnetic vector potential – Magneto statics boundary conditions – Multipolar expansion of the vector potential - illustrative examples . |
| **Week 7** | First Exam |
| **Week 8** | Magnetic fields in matter:- Magnetization – diamagnetism – paramagnets – ferromagnetism – Torques and forces on magnetic dipoles– illustrative examples . |
| **Week 9** | Maxwell,s equations:- Electrodynamics before Maxwell – How maxell fixed Ampere,s law – Maxwell,s equations- illustrative examples. |
| **Week 10** | Maxwell equations in matter – Boundary conditions – Conservation laws – Maxwell stress tensor – conservation of momentum– illustrative examples. |
| **Week 11** | Electromagnetic waves :- Waves in one dimention – the wave equation – Sinusoidal waves Boundary conditions : Rellection and transmission – illustrative examples. |
| **Week 12** | Electromagnetic waves in vacuum – The wave equation foe electric field and magnetic field- monochromatic plane waves – illustrative examples. |
| **Week 13** | Electromagnetic waves in matter:- propagation in linear media – reflection and transmissions at normal incidence – electromagnetic waves in conductors – illustrative examples . |
| **Week 14** | Potentials and fields – scalar and vector potentials – Gauge transformations – continuous distributions - – illustrative examples. |

| | |
|---|---|
| **Week 15** | Second Exam |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** |
|---|---|
| **Required Texts** | Griffiths D.J. (2014), Introduction to Electrodynamics (4th edition), Pearson Education, ISBN 978-0-321-85656-2 (UL: 537.6 GRI)<br>Supplementary texts:<br><br>Good R.H. (1999), Classical Electromagnetism, Saunders College Publishing, ISBN 0-03-022353-9 (UL: 537 GOO)<br>Lorrain P., Corson D.R. and Lorrain F. (1987), Electromagnetic Fields and Waves (3rd edition), Freeman, ISBN 0-716-71869-3 (UL: 530.141 LOR)<br>Reitz J.R., Milford F.J. and Christy R.W. (1993), Foundations of Electromagnetic Theory (4th edition), Addison-Wesley, ISBN 0-201-52624-7 (UL: 530.141 REI) |

**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2024**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name: Tikrit**
**Faculty/Institute: Sciences**
**Scientific Department: Physics**
**Academic or Professional Program Name: Bachelor's**
**Final Certificate Name: Physics**
**Academic System: First Semester**
**Description Preparation Date: 01/10/2023**
**File Completion Date: 01/10/2023**

| | |
|---|---|
| **Signature:** | **Signature:** |
| **Head of Department Name:** | **Scientific Associate Name:** |
| **Date:** | **Date:** |

**The file is checked by:**
**Department of Quality Assurance and University Performance**
**Director of the Quality Assurance and University Performance Department:**
**Date:**
**Signature:**

**Approval of the Dean**

## 1. Program Vision

**The College of Science seeks to be one of the leading higher education institutions at Tikrit University in the field of modern education and scientific research through its scientific, research and administrative activities. It also works to provide an integrated path for its students and professors to make them active and creative in serving society in the fields of natural sciences (Biology sciences - chemistry - Physics - Earth sciences) and its teaching.**

## 2. Program Mission

**Working to prepare and graduate leading scientific and leadership competencies in the natural sciences, scientific research and literature, and to develop the balance of knowledge in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively, and emphasizing social and cultural values and responding to the requirements of the local market.**

## 3. Program Objectives

**1. Embodying the vision, mission and goals of Tikrit University, and applying the best educational practices with a focus on ensuring and enhancing quality and performance.**
**2. Preparing specialized cadres capable of serving the community and preparing for the preparation of future specializations.**
**3. Spreading the culture of human diversity in society, transferring scientific knowledge and skills, writing academic research, and creative scientific achievement through student- and teaching-focused activities.**
**4. The college seeks to conclude scientific and cultural cooperation agreements with corresponding colleges and corresponding departments in different colleges to achieve best practices in the fields of teaching, learning and translation.**
**5. Focusing on the educational and moral aspects of all its members and spreading the spirit of dedication, tolerance, commitment and work to serve the nation.**
**6. Paying attention to intellectual and cultural construction through openness to the experiences of other countries in the fields of natural sciences in its various departments, as well as scientific research.**

## 4. Program Accreditation

nothing

| 5. Other external influences |
|---|
| nothing |

| 6. Program Structure | | | | |
|---|---|---|---|---|
| **Program Structure** | **Number of Courses** | **Credit hours** | **Percentage** | **Reviews*** |
| **Institution Requirements** | **40** | **2** | | **Basic course** |
| **College Requirements** | **Yes** | | | |
| **Department Requirements** | **Yes** | | | |
| **Summer Training** | **Yes** | | | |
| **Other** | | | | |

* This can include notes whether the course is basic or optional.

| 7. Program Description | | | | |
|---|---|---|---|---|
| **Year/Level** | **Course Code** | **Course Name** | **Credit Hours** | |
| **2023-2024 / year 4** | PHY 413 | **Electromagnetic theory** | **theoretical** | **practical** |
| | | | **2** | |

| 8. Expected learning outcomes of the program |
|---|
| **Knowledge** |
| **1- The student's ability to classify needs to develop theoretical and practical reality in the subject of Electromagnetic theory.**<br>**2- To get used to practicing the rules and scientific studies he has learned in his life and daily work.**<br>**3- To positively criticize the improper use of devices and components relate Electromagnetic theory .**<br>**4- To recall the information he studied carefully and verify it practically in order to find appropriate solutions to the related problems**<br>**Electromagnetic theory and equipment.**<br>**5- To decipher the unknown by measuring the known counterpart using accurate measuring devices.**<br>**6- To take note of visual physics terms and their meanings, which helps the student's development in the future?** |

## Skills

**1 - The student should devise solutions and explain some of the problems related to the sciences of Electromagnetic theory and related devices**
**Modernity and creativity.**
**2 - The student's knowledge of the concept of theoretical and practical physics of Electromagnetic theory and adaptation to overcome obstacles in this field .**
**3 - The student will design a plan to study the vocabulary of the subject of Electromagnetic theory in a new and accurate manner through...**
**Building a solid academic base for the student at the beginning of his university studies on which he can rely when trying to develop himself in this way the field.**
**4- Enabling students to analyze reality and phenomena from an accurate scientific physical perspective.**

## Ethics

**1- Reception**
**At this level, the student shows interest in the subject of Electromagnetic theory and its study, and the learning outcomes range from simple awareness to interest, to acceptance, then innovation and creativity.**
**2- Response**
**Here the student's level of interest goes beyond participation, so that he takes a position on the subject of study.**
**3- Value judgment**
**Here the student moves to a higher level by giving value to the subject, a value that has an impact on the student's personality.**
**4- Value organization**
**It means building a value system for the student based on comparison, linking, and grouping, so that the learner forms his own concepts related to value.**
**5- Normalization or labeling with value**
**It is the highest level where value is formed as a characteristic that distinguishes the student from others and influences his behavior, through which he can develop his lifestyle.**

# 9. Teaching and Learning Strategies

**1- How to deliver in-person lectures after publishing them on the class's Classroom website.**
**2- Display some pictures and shapes related to the lecture using PowerPoint.**
**3- Use some simulation programs to explain the lecture in more scientific and clear ways.**
**4- Using three-dimensional educational clips through YouTube programs, which help the student visualize the devices Visual images and their installation through this software.**

## 10. Evaluation methods

**1- Monthly exams.**
**2- Daily exams (Quiz).**
**3- Oral questions during lecture time with homework.**
**4- End of course exams**

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| **Lecturer** | **Physics** | **Electromagnetic theory** | | | **Staff** | |

### Professional Development

**Mentoring new faculty members**

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

**Professional development of faculty members**

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

## 12. Acceptance Criterion

**(Setting regulations related to enrollment in the college or institute, whether central admission or others)**

## 13. The most important sources of information about the program

Griffiths D.J. (2014), Introduction to Electrodynamics (4th edition), Pearson Education, ISBN 978-0-321-85656-2 (UL: 537.6 GRI)
Supplementary texts:

Good R.H. (1999), Classical Electromagnetism, Saunders College Publishing, ISBN 0-03-022353-9 (UL: 537 GOO)
Lorrain P., Corson D.R. and Lorrain F. (1987), Electromagnetic Fields and Waves (3rd edition), Freeman, ISBN 0-716-71869-3 (UL: 530.141 LOR)
Reitz J.R., Milford F.J. and Christy R.W. (1993), Foundations of Electromagnetic Theory (4th edition), Addison-Wesley, ISBN 0-201-52624-7 (UL: 530.141 REI)

## 14. Program Development Plan

**1- Using the latest sources and including topics that are consistent with modernity, the requirements of scientific and practical life, and what scientists have reached, on an ongoing basis.**
**2- Introducing advanced scientific equipment into the physical optics laboratory to carry out scientific experiments in the laboratory, which enhances the student's ability to understand the sciences of physical and engineering optics.**

| Program Skills Outline | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Required program Learning outcomes | | | | | | | | | | | |
| Year/Level | Course Code | Course Name | Basic or optional | Knowledge | | | | Skills | | | | Ethics | | | |
| | | | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 |
| 2023-2024 | PHY314 | Physical optics | Basic | — | | | | — | | | | — | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

## Module Information

معلومات المادة الدراسية

| | | | |
|---|---|---|---|
| PHY 413 | النظرية الكهرومغناطيسية<br>Magnetoelectric Theory | | **UGIV** |
| **Module Level** | Seven | **Semester (s) offered** | I |
| **Administering Department** | **Physics** | **College** | Science |
| **Module Leader** | Dr. Abdulsamee Fawzi Abdul Aziz | **e-mail** | Abdulsamee_fawzi@tu.edu.iq |
| **Module Leader's Acad. Title** | Lecture | **Module Leader's Qualification** | Ph.D. |

## Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

| | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | The magnetoelectric theory is one of the fundamental building-blocks of Physics. It affects profoundly the way we think about the universe and is the basis for much of condensed-matter, nuclear and statistical physics. It also has a strong influence on technological developments, for instance in optical and electronic devices. This module aims to give students a firm grounding in the subject and to prepare them for future modules such as Nuclear and High-Energy Particle Physics. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | describe the definition and interpretation of the Magnetoelectric theories and of application in Magnetoelectric fileds<br>;<br>describe the general properties of the stationary states of quantum particles confined to simple symmetric potentials;<br>perform calculations on wavefunctions, and solve the Schrödinger equation for a range of problems; |
| **Course Description** | This module introduces the mathematical expression of the basic principles of magnetoelectric and methods for finding solutions of problems that permit straightforward mathematical analysis. These solutions demonstrate many of the general features of the subject and will be applied in subsequent modules in the Physics programme. |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | 1- Develop methods and means of obtaining information related to Magnetoelectric<br>2- Developing the student's personality to become a constructive personality that possesses scientific dialogue.<br>3- Encourage students to request information from websites and libraries. |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Vector analysis:- grandient, divergence and curl – physical significance of gradient – Diveragence of a vector – physical significance of diveragence – curl of vector – physical significance of curl of vector – illustrative examples |
| **Week 2** | The vector integration:- Line integral – Surface Integral – volume integral – illustrative examples |
| **Week 3** | Gauss,s divergence theorem – greens theorems ( or two greens identities ) – Stoke,s theorem - illustrative examples. |
| **Week 4** | Separation of variables:- Use of separation of variables to solve two dimensional laplaces equation in Cartesian co-ordinate - Use of separation of variables in laplaces equation in spherical polar co – ordinates . separation of variables in laplaces equation in cylindrical co-ordinates – illustrative examples . |
| **Week 5** | Expressions for divergence, gradient, curl and laplacian:- divergence, gradient, curl and laplacian in Cartesian co-ordinates - for divergence, gradient, curl and laplacian in spherical polar co-ordanites - divergence, gradient, curl and laplacian in cylindrical co-ordanates – illustrative examples. |
| **Week 6** | Curvilinear co-ordinate system:- Cartesian coordinate system – spherical polar co-ordanate system- transformation equations- illustrative examples . |
| **Week 7** | First Exam |
| **Week 8** | Cylindrical co-ordanate system – transformation equation between cylindrical – co-oranates and curvilinear co-oradanites –genral curvilinear co-ordanite system – illustrative examples . |
| **Week 9** | Length elements in curvilinear co-ordantes – scale factors – metric coefficients – volume element in curvilinear co-ordanates – volume element in cylindrical co-ordinates system- illustrative examples. |
| **Week 10** | Electrostatatics:- The electric field – columb law – continuous charge distributions – illustrative examples. |
| **Week 11** | Divergence and curl of electrostatic fields:- field lines – flux – gausses law – Applications of gausses law – electric potential – poisons eqation – illustrative examples. |
| **Week 12** | Boundary conditions and uniqueness theorems – First uniqueness thermo – Conductors and the second uniqueness theorm – illustrative examples. |
| **Week 13** | The methods of images:- The classic image problem – induced surface charge – force and energy – other image problems – illustrative examples . |
| **Week 14** | Electric fields in matter :- Polarization – dielectrics – induced dipoles – Alignment of polar molecules – Bound charges – physical interpretation of bound charges –Linear dielectrics – illustrative examples. |
| **Week 15** | **Second Exam** |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text |
|---|---|
| **Required Texts** | Griffiths D.J. (2014), Introduction to Electrodynamics (4th edition), Pearson Education, ISBN 978-0-321-85656-2 (UL: 537.6 GRI)<br>Supplementary texts:<br><br>Good R.H. (1999), Classical Electromagnetism, Saunders College Publishing, ISBN 0-03-022353-9 (UL: 537 GOO)<br>Lorrain P., Corson D.R. and Lorrain F. (1987), Electromagnetic |

| | |
|---|---|
| | Fields and Waves (3rd edition), Freeman, ISBN 0-716-71869-3 (UL: 530.141 LOR)<br>Reitz J.R., Milford F.J. and Christy R.W. (1993), Foundations of Electromagnetic Theory (4th edition), Addison-Wesley, ISBN 0-201-52624-7 (UL: 530.141 REI) |