



Course Specification

— (Bachelor)

Course Title: **Computer for Physics**

Course Code: **PHYS26494**

Program: **Physics**

Department: **Physics**

College: **Science**

Institution: **University of Bisha**

Version: **3**

Last Revision Date: 25 July 2023



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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 Lecture – 1 Laboratory)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: 7th Level / 4th year

4. Course general Description

This course acquisition of basic knowledge in computer applications in physics, includes programming numerical methods by using MATLAB.

5. Pre-requirements for this course:

NA

6. Co- requirements for this course:

NA

7. Course Main Objective(s)

Recognize the fundamental of computer applications in physics.

2. Teaching mode (mark all that apply)

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

3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1. | Lectures | 30 |
| 2. | Laboratory/Studio | 30 |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | |



| | |
|-------|----|
| Total | 60 |
|-------|----|

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

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|--|-----------------------------------|----------------------------|--|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | Recognize Programming basics by using MATLAB. | K.1 | Lectures Solve problems | Written test Reports Homework Quizzes |
| 2.0 | Skills | | | |
| 2.1 | Write computer Programs by using MATLAB. | S.4 | Laboratory practices | laboratory test Written test Reports Homework |
| 2.2 | Plot 2D and 3D data by using MATLAB. | S.4 | | |
| 2.3 | Solve Problems by simulation (Ordinary Differential Equations, Computing Integrals, Simulink). | S.4 | | |
| 3.0 | Values, autonomy, and responsibility | | | |
| 3.1 | Participate in the development of team performance. | V.3 | Work group | Reports Presentations |

C. Course Content

| No | List of Topics | Contact Hours |
|----|---|---------------|
| 1. | Generalities 1 Introduction Description of MATLAB | 4.5 |
| 2. | Basic operations Getting started with MATLAB | 4.5 |
| 3. | Vectors Vector creation Addressing and indexing Vector combination | 4.5 |
| 4. | Matrices Creation of matrices Transposition Scalar-matrix operations Operations between matrices Division Special matrices | 4.5 |





| | | |
|-------|---|-----|
| | Characteristics of matrices | |
| 5. | Polynomials polynomial manipulation root of a polynomial determination of the coefficients of a polynomial from these roots polynomial product simple element decomposition | 4.5 |
| 6. | Program in MATLAB Scripts Functions Loop Tests | 4.5 |
| 7. | Graphic Representation Graphic representation of 2D Representation of several curves Histogram Main graphic instructions Other types of representation | 4.5 |
| 8. | Symbolic calculation Symbolic math toolbox A little symbolic calculation | 4.5 |
| 9. | Solving Ordinary Differential Equations Computing Integrals | 4.5 |
| 10. | Simulink General Example Simulink program | 4.5 |
| Total | | 45 |

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

| | Course Learning Outcomes | | | | |
|----------|--------------------------|-----|-----|-----|-----|
| | 1.1 | 2.1 | 2.2 | 2.3 | 3.1 |
| Topic 1 | ✓ | ✓ | | | ✓ |
| Topic 2 | ✓ | ✓ | | | ✓ |
| Topic 3 | ✓ | ✓ | | | ✓ |
| Topic 4 | ✓ | ✓ | | | ✓ |
| Topic 5 | ✓ | ✓ | | | ✓ |
| Topic 6 | ✓ | ✓ | | | ✓ |
| Topic 7 | ✓ | | ✓ | | ✓ |
| Topic 8 | ✓ | | | ✓ | ✓ |
| Topic 9 | ✓ | | | ✓ | ✓ |
| Topic 10 | ✓ | | | ✓ | ✓ |





D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|----|---|--------------------------------|--------------------------------------|
| 1. | Homework, quizzes, reports, and presentation. | 1: 15 | 10 % |
| 2. | First term exam | 7: 8 | 10 % |
| 3. | Second term exam | 12:13 | 10 % |
| 4. | Practical exam | 15 | 20 % |
| 5. | Final exam | End of Semester | 50 % |

E. Learning Resources and Facilities

1. References and Learning Resources

| | |
|--------------------------|---|
| Essential References | <ul style="list-style-type: none"> - Introduction to Numerical Methods and Matlab Programming for Engineers, Todd Young and Martin J. Mohlenkamp, Ohio University, Athens, (2017). - Svein Linge, Hans Petter Langtangen, A Gentle Introduction to Numerical Simulations with MATLAB/Octave, springer 2010. |
| Supportive References | <ul style="list-style-type: none"> - Software (MATLAB) |
| Electronic Materials | <ul style="list-style-type: none"> - Blackboard. - PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha |
| Other Learning Materials | NA |

2. Required Facilities and equipment

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

F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|--|---------------------|--|
| Extent of achievement of course learning outcomes. | Teachers, students. | Direct (Final exams), Indirect (Questionnaire). |
| Effectiveness of teaching. | Teachers, students. | Indirect (Questionnaire) |
| Effectiveness of assessment. | Teachers, students. | Indirect (Questionnaire) |



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

G. Specification Approval Data

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

