

**Department of Mining, Petroleum and Metallurgical Engineering**

**Cairo University  
Faculty of Engineering**

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| **Course Specifications PHY 120B** | | | | | | | | | | | | | | | | | |
| **Program(s) on which this course is given:** | | | | | | | Mining, Petroleum and Metallurgical Engineering | | | | | | | | | | |
| **Department offering the program:** | | | | | | | Mining, Petroleum and Metallurgical Engineering | | | | | | | | | | |
| **Department offering the course:** | | | | | | | Math and Engineering Physics | | | | | | | | | | |
| **Academic Level:** | | | | | | | 1st Year Mining, Petroleum and Metallurgical Engineering (2nd Year in a five-year program) | | | | | | | | | | |
| **Date** | | | | | | | 2014 | | | | | | | | | | |
| **Semester (based on final exam timing)** | | | | | | | Fall Spring | | | | | | | | | | |
| **A- Basic Information** | | | | | | | | | | | | | | | | | |
| **1. Title:** | Physics (2) | | | | | | | | | **Code:** | | | PHY 120B | | | | |
| **2. Units/Credit hours per week:** | | Lectures | | | 3 | | | Tutorial | | | 1 | Practical | | 1 | | Total | 5 |
| **B- Professional Information** | | | | | | | | | | | | | | | | | |
| **1. Course description:** | | | | In this course, the student should learn the basics of X-ray physics and crystal structure. For the X-ray physics, the student gets sufficient knowledge about its nature, spectrum, absorption, detection, instruments diffraction methods and ultrasonic. For the crystal structure part, the student learns the basics of the crystal systems, structural crystallography, directions and projection. | | | | | | | | | | | | | |
| **2. Intended Learning Outcomes of Course (ILOs):** | | | | **a) Knowledge and Understanding** | | | | | | | | | | | | | |
| 1- Concepts and theories of mathematics and sciences, appropriate to the discipline | | | | | | | | | | | | | |
| 2- Characteristics of engineering materials related to the discipline. | | | | | | | | | | | | | |
| 3- Principles of design including elements design, process and/or a system related to specific disciplines. | | | | | | | | | | | | | |
| 4- Methodologies of solving engineering problems, data collection and interpretation | | | | | | | | | | | | | |
| 5- Contemporary engineering topics. | | | | | | | | | | | | | |
| **b) Intellectual Skills** | | | | | | | | | | | | | |
| 6- Select appropriate mathematical and computer-based methods for modeling and analyzing problems. | | | | | | | | | | | | | |
| 7- Select appropriate solutions for engineering problems based on analytical thinking. | | | | | | | | | | | | | |
| 8- Think in a creative and innovative way in problem solving and design. | | | | | | | | | | | | | |
| 9- Combine, exchange, and assess different ideas, views, and knowledge from a range of sources. | | | | | | | | | | | | | |
| 10- Assess and evaluate the characteristics and performance of components, systems and processes. | | | | | | | | | | | | | |
| 11- Investigate the failure of components, systems, and processes. | | | | | | | | | | | | | |
| **c) Professional and Practical Skills** | | | | | | | | | | | | | |
| 12- Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems. | | | | | | | | | | | | | |
| 13- Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services. | | | | | | | | | | | | | |
| 14- Create and/or re-design a process, component or system, and carry out specialized engineering designs. | | | | | | | | | | | | | |
| 15- Exchange knowledge and skills with engineering community and industry. | | | | | | | | | | | | | |
| 16- Prepare and present technical reports. | | | | | | | | | | | | | |
| **d) General and Transferable Skills** | | | | | | | | | | | | | |
| 17- Collaborate effectively within multidisciplinary team. | | | | | | | | | | | | | |
| 18- Communicate effectively. | | | | | | | | | | | | | |
| 19- Acquire entrepreneurial skills. | | | | | | | | | | | | | |
| 20- Refer to relevant literatures. | | | | | | | | | | | | | |
| **3. Contents** | | | | | | | | | | | | | | | | | |
| **Topic** | | | | | | **Total hours** | | | **Lectures hours** | | | | | | **Tutorial/ Practical hours** | | |
| Why quantum mechanics? | | | | | |  | | |  | | | | | |  | | |
| Simple Models of atom | | | | | |  | | |  | | | | | |  | | |
| Crystallographic structure | | | | | |  | | |  | | | | | |  | | |
| Nuclear radiation | | | | | |  | | |  | | | | | |  | | |
| **4. Teaching and Learning Methods** | | | | | | Lectures (\*) | | | Practical Training/ Laboratory ( ) | | | | | | Seminar/Workshop ( ) | | |
| Class Activity (\*) | | | Case Study ( ) | | | | | | Projects ( ) | | |
| E-learning ( ) | | | Assignments /Homework (\*) | | | | | | Other: | | |
| **5. Student Assessment Methods** | | | | | | | | | | | | | | | | | |
| * **Assessment Schedule** | | | | | | | | | **Week** | | | | | | | | |
| -Assessment 1; Class test | | | | | | | | | every each week | | | | | | | | |
| -Assessment 2; Project Assignment | | | | | | | | |  | | | | | | | | |
| -Assessment 3; Presentations | | | | | | | | | 13 | | | | | | | | |
| -Assessment 3; Midterm Exam | | | | | | | | | 10 | | | | | | | | |
| -Assessment 4; Final Exam | | | | | | | | | End of Term | | | | | | | | |
| * **Weighting of Assessments** | | | | | | | | | | | | | | | | | |
| -Mid-Term Examination | | | | | | | | | 40 | | | | | | | | |
| -Final-term Examination | | | | | | | | | 70 | | | | | | | | |
| -Project | | | | | | | | |  | | | | | | | | |
| -Class Test | | | | | | | | | 15 | | | | | | | | |
| -Presentation | | | | | | | | |  | | | | | | | | |
| -Total | | | | | | | | | 125 | | | | | | | | |
| **6. List of References** | | | | | | | | | | | | | | | | | |
| 1. “Applied Physics for Mningl Engineering,” Engineering Physics Dept., Cairo University, Egypt, 2007 | | | | | | | | | | | | | | | | | |
| 1. “Experimental Physics Lab for First Year” Engineering Physics Dept., Cairo University, Egypt, 2007. | | | | | | | | | | | | | | | | | |
| 1. http://www.physicsdaily.com/physics/ | | | | | | | | | | | | | | | | | |
| **7. Facilities Required for Teaching and Learning** | | | | | | | | | | | | | | | | | |
| 1. Data Show and white board 2. Well equipped labs with sufficient number of calibrated experiments with respect to number of students | | | | | | | | | | | | | | | | | |
| **Course Coordinator:** | | | Dr. Abd El-Rahman Moghazy | | | | | | | | | | | | | | |
| **Head of Department:** | | | Prof. Dr. E.M.Elbana | | | | | | | | | | | | | | |

