

**Department of Electronics and Electrical Communications
Engineering**

**Cairo University
Faculty of Engineering**

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| **Course Specifications** |
| **Program(s) on which this course is given:** | Materials and Metallurgical Engineering |
| **Department offering the program:** | Department of Mining, Petroleum and Metallurgical Engineering |
| **Department offering the course:** | Department of Mining, Petroleum and Metallurgical Engineering |
| **Academic Level:** | 2nd year |
| **Date**  | 2014 |
| **Semester (based on final exam timing)** |  Fall ● Spring |
| **A- Basic Information** |
| **1. Title:** | Physical Metallurgy 1 | **Code:** |  MET 202B |
| **2. Units/Credit hours per week:**  | Lectures | 4 | Tutorial | 2 | Practical | **0** | Total | 6 |
| **B- Professional Information** |
| **1. Course description:** | course are to provide the student with the fundamental concepts and language of the internal crystal structure of solids, the imperfections and the diffusion in solids, and the process of the solidification of metals; and to develop an awareness of engineering materials and their properties. |
| **2. Intended Learning Outcomes of Course (ILOs):** |  **a) Knowledge and Understanding** |
| 1. Engineering principles and Basic topics related with engineering generally and metals and alloys particularly including information and computer technology. |
| 2. Fundamentals of materials science and physical metallurgy their relation to metallurgical and materials related topics. |
| 3. Stress analysis in engineering applications and mechanical properties and their relationship to shaping and manufacturing methods and failure of systems. |
| **b) Intellectual Skills** |
| 4. Assess and evaluate the characteristics, performance and failure of components, systems and processes. |
| 5. Select and identify the appropriate material and manufacturing aspects of design of a component.  |
| 6. Solve engineering problems, often on the basis of limited and possibly contradicting information appreciating the role of information technology in providing support for metallurgical engineers. |
| **c) Professional and Practical Skills** |
| 7. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services. |
| 8. Use appropriate mechanical testing, corrosion testing, optical, X-ray, and electron metallographic, and chemical analysis methods for metals and alloys. |
| **d) General and Transferable Skills** |
| 9. Search for information and engage in life-long self learning discipline to learn ccurrent engineering technologies and contemporary metallurgical engineering topics related to metallurgical engineering. |
| **3. Contents** |
| **Topic** | **Total hours** | **Lectures hours** | **Tutorial/ Practical hours** |
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| **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  | 3, 5 10 |
| -Assessment 2; Project Assignment  | 2, 4, 6, 9, 12 |
| -Assessment 3; Presentations  | 13 |
| -Assessment 3; Midterm Exam | 8 |
| -Assessment 4; Final Exam | End of the term |
| * **Weighting of Assessments**
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| -Mid-Term Examination | 13.33% |
| -Final-term Examination  | 60% |
| -Project | 6.7% |
| -Class Test | 6.7% |
| -Presentation | 13.33% |
| -Total | 100% |
| **6. List of References** |
| 6.a. Course Notes |
| 6.b. Essential Books (Text Books)  |
| --William D. Callister, Jr., "Materials science and engineering-An introduction", John Willey & Sons, Inc., 2007.--Michael F.Ashby & David R.H. Jones, "Engineering materials – An introduction to microstructures, processing and design", Pergamon press, 1986. |
| 6.c. Recommended Books. --------- |
| 6.d. Periodicals, Web Sites, … etc: N/A |
| **7. Facilities Required for Teaching and Learning** |
| - Small group of students.  |
| **Course Coordinator:** | Prof. Dr. Ahmed Mohamed El-Sheikh |
| **Head of Department:**  | **Prof. Dr. E. M. Elbana** |

