

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

**Cairo University  
Faculty of Engineering**

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| **Course Specifications MTH 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 | | | | | | | | | | |
| **Date** | | | | | | | 2014 | | | | | | | | | | |
| **Semester (based on final exam timing)** | | | | | | | Fall Spring | | | | | | | | | | |
| **A- Basic Information** | | | | | | | | | | | | | | | | | |
| **1. Title:** | Mathematics (2) | | | | | | | | | **Code:** | | | MTH120B | | | | |
| **2. Units/Credit hours per week:** | | Lectures | | | 3 | | | Tutorial | | | 1 | Practical | | **0** | | Total | 4 |
| **B- Professional Information** | | | | | | | | | | | | | | | | | |
| **1. Course description:** | | | | At the end of this course, the student should be able to:  • Perform multiple integration using different techniques.  • Find the best curve fitting for a given data.  • Studying the basic principles of interpolation and extrapolation.  • Apply different numerical methods to solve ODEs.  • Examine the convergence of any numerical techniques.  • Apply Laplace transform and the inverse Laplace for a given function. | | | | | | | | | | | | | |
| **2. Intended Learning Outcomes of Course (ILOs):** | | | | **a) Knowledge and Understanding** | | | | | | | | | | | | | |
| 1- Concepts and theories of mathematics and sciences, appropriate to the discipline. | | | | | | | | | | | | | |
| 2- Basics of information and communication technology (ICT) | | | | | | | | | | | | | |
| 3- Methodologies of solving engineering problems, data collection and interpretation | | | | | | | | | | | | | |
| 4- Contemporary engineering topics. | | | | | | | | | | | | | |
| **b) Intellectual Skills** | | | | | | | | | | | | | |
| 5- Select appropriate mathematical and computer-based methods for modeling and analyzing problems. | | | | | | | | | | | | | |
| 6- Select appropriate solutions for engineering problems based on analytical thinking. | | | | | | | | | | | | | |
| 7- Think in a creative and innovative way in problem solving and design. | | | | | | | | | | | | | |
| 8- Combine, exchange, and assess different ideas, views, and knowledge from a range of sources. | | | | | | | | | | | | | |
| 9- Assess and evaluate the characteristics and performance of components, systems and processes. | | | | | | | | | | | | | |
| 10- Solve engineering problems, often on the basis of limited and possibly contradicting information. | | | | | | | | | | | | | |
| **c) Professional and Practical Skills** | | | | | | | | | | | | | |
| 11- Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems. | | | | | | | | | | | | | |
| 12- Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services. | | | | | | | | | | | | | |
| 13- Create and/or re-design a process, component or system, and carry out specialized engineering designs. | | | | | | | | | | | | | |
| 14- Exchange knowledge and skills with engineering community and industry. | | | | | | | | | | | | | |
| 15- Prepare and present technical reports. | | | | | | | | | | | | | |
| 16- Apply of modern science and engineering in the discovery, development, exploitation, and use of natural mineral deposits. | | | | | | | | | | | | | |
| **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** | | |
| Multiple integral | | | | | | 16 | | | 10 | | | | | | 6 | | |
| Curve fitting technique | | | | | | 12 | | | 8 | | | | | | 4 | | |
| Interpolation | | | | | | 10 | | | 6 | | | | | | 4 | | |
| Numerical solution of ODE | | | | | | 14 | | | 8 | | | | | | 6 | | |
| Laplace transform | | | | | | 18 | | | 10 | | | | | | 8 | | |
| Applications | | | | | | 5 | | | 3 | | | | | | 2 | | |
| **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 | | | | | | | | | 4, 6 | | | | | | | | |
| -Assessment 2; Project Assignment | | | | | | | | | 10 | | | | | | | | |
| -Assessment 3; Presentations | | | | | | | | |  | | | | | | | | |
| -Assessment 3; Midterm Exam | | | | | | | | | 8 | | | | | | | | |
| -Assessment 4; Final Exam | | | | | | | | | 16 | | | | | | | | |
| * **Weighting of Assessments** | | | | | | | | | | | | | | | | | |
| -Mid-Term Examination | | | | | | | | | 15% | | | | | | | | |
| -Final-term Examination | | | | | | | | | 68% | | | | | | | | |
| -Project | | | | | | | | | 7% | | | | | | | | |
| -Class Test | | | | | | | | | 10% | | | | | | | | |
| -Presentation | | | | | | | | |  | | | | | | | | |
| -Total | | | | | | | | |  | | | | | | | | |
| **6. List of References** | | | | | | | | | | | | | | | | | |
| Lecturer notes (in English). | | | | | | | | | | | | | | | | | |
| “Mathematics, First Year for Engineering Students”, Department of Engineering Math. & Physics - Faculty of Engineering – Cairo university, 2006. | | | | | | | | | | | | | | | | | |
| **7. Facilities Required for Teaching and Learning** | | | | | | | | | | | | | | | | | |
| White board, data show, projector. | | | | | | | | | | | | | | | | | |
| **Course Coordinator:** | | | Dr. Abdel Hakam Fadl | | | | | | | | | | | | | | |
| **Head of Department:** | | | Prof. Dr. E.M.Elbana | | | | | | | | | | | | | | |

