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| **جامعة بنهاBenha University** **Faculty of Science****Department of Geology** |
| **Course Specification****232 G: Principals of Petrology** |
| **A. Affiliation** |
| **Relevant program:** |  **B.Sc. in Geology** |
| **Department offering the program:** | **Department of Geology** |
| **Department offering the course:** | **Department of Geology** |
| **Academic year/level:**  | **Second level** |
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| B. Basic information |
| **Title: Principals of Petrology** | **Code:** **232** **G** | **Year/level:** Second level |
| **Teaching Hours:** | **Lectures:** 2 | **Tutorial:** 0 |
|  | **Practical:** 2 | **Total:** 4 h/week |
| C. Professional information |
|  **1. Course Learning Objectives:** |
| This course is designed to deliver theoretical and practical understanding ofmagmatic crystallization, classification of igneous rocks and their textures, acidic rocks, intermediate rocks, basic rocks and ultrabasic rocks. It also introduces the major classification of metamorphic rocks based on T & P and chemical active fluids, metasomatism and additive processes of metamorphism |

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| **2. Intended Learning Outcomes (ILOS)** |
| **a. Knowledge and understanding:**On successful completion of the course, the student should:**a1.** provide an overview of fundamental of magama crystallization,**a2.** review the different processes of magma crystallization and evolution, **a3.** recognize the different types of rocks and their petrogrnesis,  |
| **b. Intellectual skills:**On successful completion of the course, the student should be able to.**b1.** differentiate between different types of rocks,**b2.** determine the texture and mineral composition of igneous and metamorphic rocks,**b3.** analyze the mineral composition of rocks and their tectonic setting,**b4.** recognize the different minerals based on their optical properties.  |
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| **c. Practical and professional skills:**On successful completion of the course, the student should be professionally able to: **c1.** recognize the rock type and class, and genesis,  **c2.** analyze the mineral composition of a given rock, **c3.** use the polarizing microscope and identify minerals and their optical properties,  **c4.** apply the investigation results for rock classification and distinctions. |
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| **d. General skills:**On successful completion of the course, the student should be able to:**d1.** collect data from sample examination and other data resources, **d2.** reproduce the results to meet the projected goals in an easy, readable final form, **d3.** collaborate and work in team smoothly adhere to ethics and manage time. |

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| **3 - Contents** |
| **Topic** | **Lecture hours** | **Tutorial hours** | **Practical hours** |
| 1. Introduction and course description
 | 2 |  | 2 |
| 1. What is a rock?
 | 2 |  | 2 |
| 1. Classification of rocks
 | 2 |  | 2 |
| 1. How rocks form?
 | 2 |  | 2 |
| 1. Mineral compostion of mantle rocks
 | 2 |  | 2 |
| 1. Mineral composition of crustal rocks
 | 2 |  | 2 |
| 1. Rock textures
 | 2 |  | 2 |
| 1. Mineral composition of igeous and metamorphic rocks
 | 2 |  | 2 |
| 1. Phosphate, oxides, and sulfate
 | 2 |  | 2 |
| 1. Rock cycle and tectonisim
 | 2 |  | 2 |
| 1. Rock forming minerals
 | 2 |  | 2 |
| 1. Minerals and rocks under the microscope
 | 2 |  | 2 |
| 1. Mineral deposits and rock genesis
 | 2 |  | 2 |
| 1. Revision and course evaluation/open session
 | 2 |  | 2 |
| **Total hours** | **28** |  | **28** |

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| **4 - Teaching and Learning methods:** |
| **Intended Learning Outcomes** | **Lecture** | **Presentations**  | **Discussions & Seminars** | **Practical** | **Problem solving** | **Brain storming** |
| **Knowledge & Understanding** | a1. | review the evolution and history of the different terms in petrology,  | 🗸 | 🗸 |  | 🗸 |  |  |
| a2. | recognize the earth zones and compositions of earth shells, | 🗸 | 🗸 |  | 🗸 |  |  |
| a3. | describe the classification of rocks (rock cycle), | 🗸 | 🗸 |  | 🗸 |  |  |
| a4. | demonstrate the basics and theories of the origin of igneous rocks, | 🗸 | 🗸 |  | 🗸 |  |  |
| **Intellectual Skills** | b1. | differentiate between different forms of Igneous Rocks as well as the intrusions and their relation to geologic structures,  | 🗸 | 🗸 |  | 🗸 | 🗸 | 🗸 |
| b2. | determine the structures and textures of igneous rocks, | 🗸 |  |  | 🗸 |  |  |
| b3. | Demenostsate thec lassification of igneous rocks, | 🗸 | 🗸 |  | 🗸 | 🗸 |  |
| b4. | Recognize some types of igneous rockstypes of crystal forms.  | 🗸 | 🗸 | 🗸 | 🗸 |  |  |
| **Practical and professional skills** | c1. | recognize the metamorphic petrology and metamorphism,  |  | 🗸 | 🗸 | 🗸 | 🗸 |  |
| c2. | determine the agents, kinds, and depth zones of metamorphism, | 🗸 | 🗸 |  | 🗸 |  |  |
| c3. | use the polarizing microscope and identify the metamorphic textures, | 🗸 | 🗸 |  | 🗸 | 🗸 |  |
| c4. | apply the investigation results for rock classification and distinctions. | 🗸 | 🗸 |  | 🗸 |  |  |
| **General Skills** | d1. | collect data from sample examination and other data resources,  | 🗸 | 🗸 | 🗸 | 🗸 |  |  |
| d2. | reproduce the results to meet the projected goals in an easy, readable final form, | 🗸 | 🗸 |  | 🗸 |  |  |
| d3. | collaborate and work in team smoothly adhere to ethics and manage time. | 🗸 | 🗸 |  | 🗸 | 🗸 | 🗸 |

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| **5. Students’ Assessment Methods and Grading:** |

**5.1.** Discussion, class activites and quizzes to assess the student progress and personal attitude,

**5.2.** Assignments to assess the student independen work,

**5.3.** Written mid-term exam to ensure the student progress and discover the shortage,

**5.4.** Final written and oral exams to evaluate students and promote for other consequent courses.

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| **Tools** | **To Measure** | **Time schedule** | **Grading** |
| Semester work | ILOs a, b, d  | Semester course | 8 % |
| Mid-Term exam | First ½ of ILOs a, b, c  | Seventh week | 6 % |
| Practical exam | ILOs c, b | Thirteenth week | 24 % |
| Oral exam | ILOs c, b | Thirteenth week | 14 % |
| Final written exam | ILOs a, b, c  | Fourteenth week | 48 % |
| Total | 100 % |

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| **6. List of references:** |
| **6.1. Course notes**Lecture notes prepared by the course instructor(s) approved by the department council**6.2. Required books** None**6.3. Recommended books*** **The principles of petrology: an introduction to the science of rocks.**

By Tyrrell, George Walter.Publisher: Springer Science & Business Media. 2012* **Principles of Igneous and Metamorphic Petrology**

by Anthony Philpotts, Jay Ague. Publisher: Cambridge University Press; 2nd edition (February 2, 2009), 686 pages **6.4. Periodicals, Web sites, etc.**<http://www.xtal.iqfr.csic.es/Cristalografia/parte_03-en.html><http://www.webpages.uidaho.edu/~mgunter/opt_min/article.pdf><http://dave.ucsc.edu/myrtreia/crystal.html> |
| **7. Facilities required for teaching and learning:** |
| Power point presentations Data show Sound system to ensure the ease listening Group discussions   |
| **Course coordinator:** | Prof. Basem ZoheirDr. Amr Abdelnasser |  |
| **Head of the Department:** | Prof. Dr. Mohamed El-Fakharany |
| **Date:** | 2016-2017 |  |