



|  |  |  |  |
| --- | --- | --- | --- |
| Shoubra Faculty of Engineering |  | Course Specifications : **Composite Materials (MED 512)** |   |
|  |  |

**University**: Benha University

**Faculty**: Shoubra Faculty of Engineering

**Department**: Mechanical Engineering Department

**Program(s) on which the course is given:** Post Graduate **Diploma.** In Production & Design (Material Engineering)

**Compulsory or Elective element of program:** Compulsory

**Department offering the program:**  Mechanical Engineering/ Production

**Academic year / Level:** year/ 2014/2015

**Date of specification approval:** 2012

1. **Basic Information**

**Title: Composite Materials Code:** MED 512

**Credit Hours: 3 Lecture: 3**

**Tutorial: - Practical: - Total: 3**

1. **Professional Information**
2. **Course Aims:**

This course introduces students to:

 1- Provide study which will be informed by the forefront of both the academic and professional elements of the Material Engineering discipline.

2- Provide a study of manufacturing techniques for composite materials.

3- Provide study of the design of tests for materials properties.

**Intended Learning Outcomes of Course (ILOs)**

By completion of the course, the student would able to promote:

**2.1. Knowledge and Understanding:**

2.1.3 Describe principles and fundamentals of metal matrix.

2.1.4 Explain the effect of type and percentage of reinforced material in composites.

2.1.5 Demonstrate methodologies and test used for analyzing the mechanical and structure properties of composite materials.

**2.2. Intellectual Skills:**

2.2.1 Describe and analyze the problems occurred during fabrication of composite materials.

2.2.2 Solve material engineering problems in composite materials.

2.2.3 Promote creative and analytical thinking in the area of composite materials.

2.2.4 Assess the risks and hazards in composite material application.

**2.3. Professional and Practical Skills:**

2.3.1 Apply professional skills in the heat treatment of composite materials.

2.3.2 Prepare professional to evaluate the mechanical & structure examination of composite material.

2.3.3 Plan and implement experiment design and evaluate testing

**2.4. General and Transferable Skills:**

2.4.2 Use information technology in order to serve the types of composite material applications.

2.4.5 Work in a group and manage time effectively.

2.4.6 Lead a team in familiar professional contexts.

**3- Course Contents:**

|  |  |  |  |
| --- | --- | --- | --- |
| **No of week** | **Topic** | **No. of hours** | **Program ILOs** |
| 1 | Composite Materials classification  | 3 | (2.1.3), (2.1.4), (2.1.5) |
| 2 | Applications of Composite Materials | 3 |
| 3 | Fabrication of Composite Materials | 3 |
| 4, 5 | Fabrication of metal-base Composite Materials | 6 |
| 6, 7 | Fabrication of ceramic-base Composite Materials | 6 | (2.2.1), (2.2.2), (2.2.3) |
| 8 | Mid-term exam | 3 |  - |
| 9, 10 | Honeycomb shaped materials | 6 | (2.2.1), (2.2.4) |
| 11 | Design factors | 3 | (2.3.1) |
| 12 | Fibers resistance | 3 | (2.3.1),(2.3.2),(2.3.3) |
| 13 | Case Studies | 3 | (2.4.2), (2.4.6) |
| 14 | Oral exam | 3 |  (2.4.5), (2.4.6) |
| 15 | Final-term exam | 3 |  - |
| Total  |  45 |  |

**4- Course Matrix:**

|  |  |  |
| --- | --- | --- |
| **ILO’s code number** | **Teaching/learning methods and strategies** | **Assessment methods and strategies** |
| 2.1.32.1.42.1.5 | Formal lectures. | Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.  |
| 2.2.12.2.22.2.32.2.4 | Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises. | Analysis and problem-solving skills are assessed through oral and written examinations. |
| 2.3.12.3.22.3.3 | Experiments demonstrations, practical work,  | Coursework exercises and reports, project reports and presentations. |
| 2.4.22.4.52.4.6 | Those skills are not explicitly taught; however, along the course of study the student will acquire those skills to be able to perform his obligations.  | Project presentation. |

**5- Assessment Schedule:**

Assessment 1 Assignments on weeks 2,3,4,5,7,9,11,13

Assessment 2 Quizzes on weeks 6, 12

Assessment 3 Mid-term exam on weeks 8

Assessment 4 Oral exam on week 14

Assessment 5 Final exam on week 15

**6- Weighting of Assessments:**

* 20% (60 points) Home assignments, Quizzes, and reports
* 20% (60 points) Mid-term examination and Oral examination
* 60% (180 points) Final-term examination
* 100% (300 points) Total

**7- List of References:**

 7.**1 Essential Books (Text books):**

* Course notes prepared by instructor (Power Point & Case Studies)
* Krishan K. Cha, “Composite Materials: Science and Engineering”, (2013).
* D. Hull, ‎T. W. Clyne, “An Introduction to Composite Materials”, (1996).

 **7.2 Recommended Books & Websites.**

* www.google.com
* www.sciencedirect.com

**8- Facilities Required for Teaching and Learning:**

* Lecture room equipped with overhead projector
* Presentation board, computer and data show

**Course coordinator:**

**Course instructor:**

**Head of department:** Prof. Dr. Osama Ezzat