***Course Specifications of:***

***Non-Conventional Machining*****(*MED 508*)**

**Program(s) on which the course is given:** Diploma in Automation and Mechatronics

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

**Department offering the program:** Mechanical Engineering

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

**Date of specification approval:** 2012

1. **Basic Information**

**Title:** Non-traditional machining **Code: MED 508**

**Credit Hours: 3 Lecture: 3**

**Tutorial: Practical: Total: 3**

**B- Professional Information**

1. **Overall aims of course:**

This course introduces students to :

* Understands the new features of non conventional machines

1. **Intended learning outcomes of course (ILOs)**

By completion of the course, the student should be able to:

**2.1 Knowledge and understanding**

2.1.2 Demonstrate knowledge and understanding of applied mathematical principles necessary to underpin their education in mechatronic engineering and to enable them to apply mathematical methods.

2.1.4 Demonstrate extensive knowledge and practical understanding of management and business practices, and their limitations, and how these maybe applied appropriately.

**2.2 Intellectual skills**

2.2.1 Demonstrate understanding of engineering principles and apply them to analyze key mechatronic engineering processes.

2.2.3 Apply quantitative methods and computer software relevant to mechatronic engineering, in order to solve engineering problems.

2.2.5 Investigate and define a mechatronics design problem and identify constraints including environmental and sustainability limitations.

**2.3 Professional and practical skills**

2.3.2 Demonstrate extensive practicing and understanding of a wide range of engineering control and components.

2.3.2 Demonstrate extensive practicing and understanding of robotics technology.

**2.4 General and transferable skills**

2.4.1 Make effective and appropriate use of Information and Communications Technology skills.

2.4.2 Communicate effectively, both orally and in written form.

2.4.5 Use different sources for obtaining information and knowledge.

2.4.6 Set basis and standards to assess the performance of others.

2.4.7 Work in a group and Lead a team in familiar professional contexts

1. **Contents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No of weeks** | **Topic** | **No. of hours** | **Teaching / learning methods and strategies** | **Assessment method** |
| 1 | Chain saw vertical cutting | 3 | Lecture, Class activity | - |
| 2 | Non-conventional grinding operations | 3 | Lecture./Assign, case study | Assignment 1 |
| 3 | Non-conventional grinding operations | 3 | Lecture, Class activity | Assignment 1 |
| 4 | Electric vacuum machining | 3 | Lecture, Class activity | Assignment 2 |
| 5 | Electric vacuum machining | 3 | Lecture/Assign. | Assignment 2, Quiz |
| 6 | Electric vacuum machining | 3 | Lecture, Class activity | Assignment 3 |
| 7 | Electrochemical machining | 3 | Lecture, Class activity | Assignment 3, Quiz |
| 8 | **Midterm exam** | | | |
| 9 | Electrochemical machining | 3 | Lecture /Assign. | Assignment 4 |
| 10 | Chemical machining | 3 | Lecture, Class activity | Assignment 4, , Quiz |
| 11 | Chemical machining | 3 | Lecture/Assign. | Assignment 5 |
| 12 | Ultrasonic machining | 3 | Lecture, Class activity | Assignment 5 |
| 13 | Ultrasonic machining | 3 | Lecture, Class activity | Quiz |
| 14 | Laser machining | 3 | Lecture, Case Study | Oral Exam |
| 15 | **Final exam** | | | |

1. **Course Matrix**

|  |  |  |
| --- | --- | --- |
| **ILO’s code number** | **Teaching/learning methods and strategies** | **Assessment methods and strategies** |
| 2.1.2  2.1.4 | Formal lectures | Individual coursework assignments, quizzes, oral discussions and reports. Midterm and /or final written examination is given. |
| 2.2.1  2.2.3  2.2.5 | Analysis and problem‐solving skills are developed through tutorial/problem sheets and small group exercises.  Research skills are developed through a small subject oriented research project. | Analysis and problem‐solving skills are assessed through oral and written examinations.  Design and research skills are assessed through project write-ups, coursework and project reports. |
| 2.3.1  2.3.2 | Experiments demonstrations, practical work, laboratory visits. | Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations. |
| 2.4.1  2.4.2  2.4.5  2.4.6  2.4.7 | 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. Attendance of seminars, workshops or conferences will help the student in developing those skills. Presentation by students (either group or individual) will train students for those skills. | Project presentation |

1. **Teaching and Learning Methods**

* Lectures

Practical training / laboratory

Seminar / workshop

* Class activity
* Case study
* Assignments / homework

Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Student Assessment Methods**

* Assignments to assess knowledge and intellectual skills.
* Quiz to assess knowledge, intellectual and professional skills.
* Mid-term exam to assess knowledge, intellectual, professional and general skills.
* Oral exam to assess knowledge and intellectual skills.
* Final exam to assess knowledge, intellectual, professional and general skills.
* Other: Practical exam to assess knowledge, intellectual, professional and general skills.

1. **Assessment schedule**

Assessment 1 Assignments on weeks 2, 3, 4, 5 , 6, 7 ,9, 10, 11, and 12

Assessment 2 Quizzes on weeks 5, 7, 10, and 13

Assessment 3 Mid-term exam on weeks 8

Assessment 3 Oral exam on week 14

Assessment 4 Final exam on week 15

1. **Weighting of Assessments**

Mid-Term Examination 20%

Final-TermExamination 60%

Oral Examination 05%

Practical Examination 05%

Semester Work 10%

Other 00%

Total 100%

1. **List of References**
   1. **Course Notes**

* Course notes prepared by instructor
* PowerPoint slides.
  1. **Essential Books (Text Books)**
* A.E.DEBARR, & D.A.Oliver "Electrochemical Machining ", Macdonald: London, 2013.
* J.A.MCGEOUGH, "Advanced Methods of Machining ", London New York – Chapman and Hall, 2012.
* Samy j.Abed, Raouf Tawfik "Report About Laser Machining ", Benha higher Institute of Technology Mech., 2003.
  1. **Commended books**

Dr. Samy j.Abed, 2003.

Prof. Dr. Sabet R.Ghabrial 2004.

* 1. **Periodical websites**

[***www.nonconventionalmachining.com***](http://www.nonconventionalmachining.com)

**Course coordinator:** Prof. Dr. Saber Abd Rabbo

**Course instructor:** 10.10.2015

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