Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Mechanical Engineering Department

**University/Academy:** Arab Academy for Science, Technology & Maritime Transport
**Faculty/Institute:** College of Engineering & Technology
**Program:** B.Sc. Mechanical Engineering

# Form no. (12): **Course Specification**

## 1- Course Data

| Course Code: **ME 526** | Course Title: **Power Plant Measurements & Control** | | Academic Year/Level: **5** year / **10** semester |
|---|---|---|---|
| Specialization: **Mechanical** | No. of Instructional Units | Lecture | Practical |
| | **3 credits** | **2 hrs.** | **2 hrs.** |

## 2- Course Aim

- To deal and apply major process control for thermal power plant

## 3- Intended Learning Outcomes

| | |
|---|---|
| **a- Knowledge and Understanding** | **Through knowledge and understanding, students will be able to:**<br>a.4) Principles of design including elements design, process and/or a system related to specific disciplines. |
| **b- Intellectual Skills** | **Through intellectual skills, students will be able to:**<br>b.7) Solve engineering problems, often on the basis of limited and possibly contradictory information<br>b.12) Create systematic and methodic approaches when dealing with new and advancing technology. |
| **c- Professional Skills** | **Through professional and practical skills, students will be able to:**<br>c.2) Professionally merge the engineering knowledge, understanding, and feedback to improve design,<br>Products and/or services<br>c.3) Create and/or re-design a process, component or system, and carry out specialized engineering designs<br>c.5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results |

| | |
|---|---|
| | |
| **d- General Skills** | **Through general and transferable skills, students will be able to:** |

## 4- Course Content

| | |
|---|---|
| **Week No.**1 | Introduction to system concepts, instrumentation and process control. |
| **Week No.**2 | Process Variables, Process-open and Closed Loop Cycles |
| **Week No.**3 | System model representation (modelling of mechanical, electrical, and electromechanical systems) |
| **Week No.**4 | System model representation (modelling of fluid and thermal systems) |
| **Week No.**5 | System response and design of dynamic systems |
| **Week No.**6 | Static Error Effects on Error System Stability |
| **Week No.**7 | Static Error Effects on Error System Stability -7th week evaluation / 7th week evaluation |
| **Week No.**8 | Basic control action |
| **Week No.**9 | Design of controller, Ziegier-Noicls method |
| **Week No.**10 | Measurement Means, Measurements Dynamics, Identification of Measurement Devices |
| **Week No.**11 | Sensors & its Requirement |
| **Week No.**12 | Sensors & its Requirement - 12th week evaluation / $12^{th}$ week evaluation |
| **Week No.**13 | Analog signal conditioning. |
| **Week No.**14 | signal conditioning circuit |
| **Week No.**15 | Resistance – type strain gauges, force, torque and pressure load cell |
| **Week No.**16 | Final exam |

## 5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

## 6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

**Engineering Requirements and Design Considerations in college Buildings and its Leading Passages**

- The design of college buildings and pedestrian passages leading to it are sloppy to allow the transportation of the handicapped;
- Doors are wide enough to let wheel chairs pass through easily and conveniently.
- Lifts are provided for movement between floors.
- Doors are made from light weight materials to make it easy for the handicapped suffering from weakness in limb muscles or those handicapped using prosthetic limbs to deal with them with the least muscular effort.
- Class floors are made from non-slippery materials to prevent falls on the part of the handicapped.
- Sudden changes in the floor level are prevented.

**Design Considerations of the Classes**

- Class boards are placed at 60 cm high to allow wheeled chair users or those suffering from limited arm mobility use them.
- Enough spaces are left between seats and benches to prevent hindering the movement of wheeled chairs between them.
- Handicapped students sit among normal people in class to be able to interact with them. Nevertheless, in urgent cases according to the nature of the disability, the handicapped students sit in fixed suitable places whether at the front or the back of the class.
- Handicapped students sit close to the main exits of the class to be able to evacuate in case of emergencies.

**Academic Support:**

- The general academic advisor appoints an academic supervisor for handicapped students.
- Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement

## 7- Student Assessment

| | | |
|---|---|---|
| **a-Procedures used** | 1-Written Examinations to assess The Intended Learning Outcomes.<br><br>2-Class Activities (Reports, Discussions, ------) to assess The Intellectual Skills. | |
| **b- Schedule:** | Assessment 1<br>Assessment 2<br>Assessment 3<br>Assessment 4 | 7th Week Assessment<br>12th Week Assessment<br>Continuous Assessments<br>16th Week Final Written Exam |

| | | |
|---|---|---|
| **c- Weighing of Assessment** | 7th Week Evaluation | 30 % |
| | 12th Week Evaluation | 20 % |
| | Final-term Examination | 40 % |
| | Oral Examination | 00 % |
| | Practical Examination | 00 % |
| | Semester Work | 10 % |
| | Total | 100% |

**8- List of References:**

| | |
|---|---|
| **a- Course Notes** | N/A |
| **b- Required Books** (Textbooks) | • Lecture notes |
| **c- Recommended Books** | • |
| **d- Periodicals, Web Sites, etc.** | N/A |

**Course Instructor: Prof. Mohamed Teamah**

**Head of Department: Prof. El-Sayed Saber**

**Program Manager: Prof. El-Sayed Saber**

**Dean of College of Engineering and Technology of AASTMT**
Name: **Prof. Moustafa Hussein Aly**
Signature:

**Executive Manager of Quality Assurance Center of AASTMT**
Name: **Prof. Aziz Ezzat**
Signature: