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**Department of Mechanical Engineering,**

**School of Engineering,**

**University of Management and Technology**

**Course Outline**

**Course code: ME 341; Course title: Machine Tools & Machining**

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| --- | --- |
| Program | BSME |
| Credit Hours | 2 |
| Duration | One semester |
| Prerequisites | N.A. |
| Resource Person | Ahad Hanif |
| Counseling Timing | Monday, Wednesday: 10:00 to 15:00 hr |
| Contacts | ahad.hanif@umt.edu.pk |

**Chairman/Director signature………………………………….**

**Dean’s signature……………………………**

**Date………………………………………….**

**Course Learning Outcomes:**

At the end of the course students should be able to:

1. Explain the basic functions and the geometry of traditional and modern cutting tools. C2
2. Choose the cutting parameters for various machining operation. C3
3. Analyze the performance of different machine tools. C4

**Mapping of CLOs to Program Learning Outcomes (PLOs):**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Course Code** | **Title** | **Course Learning Outcomes** | **PLO 1**Engg . Knowledge | **PLO 2**Problem Analysis | **PLO 3**Solution Design | **PLO 4**Investigation | **PLO 5**Mod. Tool Usage | **PLO 6**Engr. & Society | **PLO 7**Env. &Sust. | **PLO 8**Ethics | **PLO 9** Team Work | **PLO 10**Communication | **PLO 11**Proj. Mgmt. | **PLO 12**Lifelong Learning |
| **First** | **ME 341** | **Instrumentation & Control** | 1. Explain the basic functions and the geometry of traditional and modern cutting tools. | ✓ |  |  |  |  |  |  |  |  |  |  |  |
| 2. Choose the cutting parameters for various machining operation. |  | ✓ |  |  |  |  |  |  |  |  |  |  |
| 3. Analyze the performance of different machine tools. |  |  | ✓ |  |  |  |  |  |  |  |  |  |
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**Learning Methodology:**

Classroom lectures, problem solving exercises

**Grade Evaluation Criteria**

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| --- | --- |
| **Components** | **Marks** |
| Assignment | 5 |
| Quizzes | 20 |
| Mid Term Exam | 25 |
| Final Exam | 50 |
| Total | 100 |

**Textbooks:**

1. Degarmo’s Materials and Processes in manufacturing by J.T Black and Ronald A. Kohser
2. Fundamentals of Modern Manufacturing by Mikell P. **Groover**

**Reference Books:**

1. Technology of Machine Tools by Steve F. Krar, Arthur R. Gill, Peter Smid
2. Machine Shop Tools and operations by Rex Miller and Mark Richard Miller

**Calculator:**

The course requires complex calculations. All participants are required to bring a scientific calculator to class.

**Calendar of Course Contents**

**Course code: ME341, Course title: Machine Tools & Machining**

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| --- | --- | --- | --- |
| **Lectures** | **Topics** | **Textbook Chapter(s)** | **CLOs** |
| 1 - 5 | Fundamental of machining, **Orthogonal** machining, Merchant’s model, shaping and planning. | 20 | 1 |
| 6- 10 | Cutting tools for machining, **tool geometry**, tool failure, **tool life,** cutting fluids. | 21 | 2 |
| 11 - 15 | Turning and Boring process, lathe design, work holding in lathe, estimating machining time for **turning operations**. | 22 | 3 |
| 16 | **Midterm Exam *(tentative)*** |  |  |
| 17-20 | Drilling and related hole making process, fundamental of drilling process, types of drills, tool and work holding for drilling, counter boring, counter sinking and spot facing, reaming | 23 | 1 |
| 21 -23 | Fundamentals of Milling process, milling tools and cutters, types of milling machine, estimating machining time for milling operations. | 24 | 3 |
| 24- 25 | Fundamentals of broaching, broaching machines, machining Centers | 26,27 | 2 |
| 26 – 27 | Abrasive machining process, fundamental of grinding and grinding wheel, gear making. | 28, 29 | 2 |
| 28-29 | Electronic, electrochemical and thermal machining processes, EDM. | 19 | 2 |
| 30 | **Final Exam** |  |  |

**Mapping of CLOs to Direct Assessments**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CLOs▼** | Quiz 1 | Quiz 2 | Quiz 3 | Quiz 4 | Quiz 5 | Assignment | Midterm Exam | Final Exam |
| 1 | ✓ |  |  |  |  |  | ✓ | ✓ |
| 2 |  | ✓ |  |  |  |  | ✓ | ✓ |
| 3 |  |  | ✓ | ✓ | ✓ | ✓ |  | ✓ |
| 4 |  |  |  |  |  |  |  |  |