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| **Course Plan for Mechanical Engineering / Master of Science in Smart Manufacturing** **No.: (2023/2024)** |
| **Approved by Deans Council by decision (………………) dated (………….)** |
| **)33) Credit Hours** | **Study system / hybrid program** |
| **Type of specialty** | * **Humanitarian**
 | * **Scientific / technical**
 | * **Medical Sciences**
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| --- | --- | --- |
| **Teaching style** | **Percentage of study plan hours / number** | **Model used (synchronous: asynchronous)** |
| **Complete e-learning courses** | 18% / number (6) Credit Hours | 1:1 |
| **Blended Learning courses (For Humanity)** | 45% / number (15) Credit Hours | 1:1 |
| **Blended learning courses (for scientific and medical)** | 45% / number (15) Credit Hours | 1:1 |
| **Traditional learning courses (for humanity)** | 37% / number (12) Credit Hours | 1:0 |
| **Traditional learning courses (for scientific and medical)** | 37% / number (12) Credit Hours | 1:0 |

Important note: (The teaching patterns of the subjects are distributed at all academic levels in the program, and the Thesis hours are taught in a blended learning mode).

Program vision: Building specialized competencies in the field of Smart Manufacturing, provided with the knowledge, skills and leadership, creative and entrepreneurial competencies necessary to compete in the global labor market, through creative application in the use of information technology and modern teaching and learning strategies.

Program mission and objectives:

1. Achieving the conformity of the learning outcomes in all areas of specialization with the seventh level descriptors (knowledge, skills and competencies) in the National Qualifications Framework.

2. Integrating modern information technology and employing it creatively in the teaching and learning processes in order to achieve more effective learning and take into account the needs of the learner.

3. Promote the principle of self-sustainable, lifelong learning, and highlight the creativity of the learner in light of global changes through the application of various teaching and learning strategies.

Program learning outcomes (*(MK= Main Knowledge, MS= Main Skills, MC= Main Competences)*

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| **Main knowledge** |
| MK1 | Understand the basic principles and mathematical theories related to smart manufacturing |
| MK2 | Possess general knowledge and various engineering tools to build successful pioneering engineering projects in the field of smart manufacturing |
| MK3 | Familiarity with new sources of knowledge and findings of science in the field of smart manufacturing  |
| **Basic skills** |
| MS1 | Ability to solve complex engineering problems by applying principal methods of engineering, science and mathematics |
| MS2 | Ability to produce engineering designs within determinants to find specialized engineering solutions |
| MS3 | Ability to analyze data and results using appropriate engineering experiments |
| MS4 | Ability to evaluate and supervise technical design plans |
| **General competencies** |
| MC1 | Ability to assume ethical and professional responsibilities |
| MC2 | Ability to apply leadership and communication skills within a team in the work environment  |
| MC3 | Ability to identify and address learning needs and engage in continuous learning |
| MC4 | Ability to express and apply creative skills |
| MC5 | Ability to manage mechanical engineering projects and realize their impact on society and environment |

**1. Master thesis program (33) credit hours:**

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| --- | --- | --- | --- | --- | --- |
| Teaching style | Course No. | Course name | Credit hour | Indicative | Notes |
| Fully electronic learning | Blended learning | Traditional learning | Semester | year |
| 1. **Mandatory requirements (18) credit hours**
 |
|  |  | • | 0912741 | Research Methodology | 3 | **1** | **1** |  |
|  |  | • | 0912742 | Manufacturing Control and Automation | 3 | **2** | **1** |  |
|  |  | • | 0912743 | Materials Selection for Design and Applications | 3 | **2** | **2** |  |
|  |  | • | 0912744 | Management of Global Manufacturing | 3 | **1** | **1** |  |
|  |  | • | 0912745 | Industry 4.0 | 3 | **1** | **1** |  |
|  |  | • | 0912746 | Engineering Measurements and Internet of Things  | 3 | 3 | 2 |  |
| 1. **electives requirements (6 ) credit hours**
 |
|  |  | • | 0912750 | Advanced Design and Manufacturing Processes | 3 | 3 | 1 |  |
|  |  | • | 0912751 | Molds and Die Design and Manufacturing | 3 | 3 | 2 |  |
|  |  | • | 0912752 | Systems Simulation & Modeling | 3 | 3 | 1 |  |
|  |  | • | 0912754 |  3D Printing of Electronics  | 3 | 3 | 1 |  |
|  |  | • | 0912755 | Robotics Mechanics and Control | 3 | 3 | 2 |  |
|  |  | • | 0912756 | Fundamentals and Advances in Additive Manufacturing | 3 | **1** | **1** |  |
|  |  | • | 0912757 | Special Topics in Smart Manufacturing | 3 | 3 | 2 |  |
|  |  | • | 0912758 | Machine Learning and Data Science | 3 | **2** | **2** |  |
| 1. **Thesis ( 9 ) Credit Hours**
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**2. Comprehensive exam program (33) credit hours:**

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| --- | --- | --- | --- | --- | --- |
| Teaching style | Course No. | Course name | Credit hour | Indicative | Notes |
| Fully electronic learning | Blended learning | Traditional learning | Semester | year |
| 1. **Mandatory requirements ( 24 ) credit hours**
 |
|  |  | • | 0912741 | Research Methodology | 3 | **1** | **1** |  |
|  |  | • | 0912742 | Manufacturing Control and Automation | 3 | **2** | **1** |  |
|  |  | • | 0912743 | Materials Selection for Design and Applications | 3 | **2** | **2** |  |
|  |  | • | 0912744 | Management of Global Manufacturing | 3 | **1** | **1** |  |
|  |  | • | 0912745 | Industry 4.0 | 3 | **1** | **1** |  |
|  |  | • | 0912746 | Engineering Measurements and Internet of Things  | 3 | 3 | 2 |  |
|  |  | • | 0912750 | Advanced Design and Manufacturing Processes | 3 | 3 | 1 |  |
|  |  | • | 0912752 | Systems Simulation & Modeling | 3 | 3 | 1 |  |
| 1. **electives requirements ( 9 ) credit hours**
 |
|  |  | • | 0912751 | Molds and Die Design and Manufacturing | 3 | 3 | 2 |  |
|  |  | • | 0912753 | Engineering Measurements | 3 | 3 | 2 |  |
|  |  | • | 0912755 | Robotics Mechanics and Control | 3 | 3 | 2 |  |
|  |  | • | 0912757 | Special Topics in Smart Manufacturing | 3 | 3 | 2 |  |
|  |  | • | 0912758 | Machine Learning and Data Science | 3 | **2** | **2** |  |
|  |  | • | 0912756 | Fundamentals and Advances in Additive Manufacturing | 3 | **1** | **1** |  |
| 1. **Passing comprehensive exam**
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