

# HYDROGEN ENERGY AND TECNOLOGIES

|           |                                                         |                                                                                                                                                                                                                                             |                                                                                                                                                                                        |
|-----------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b>  | Course Title:                                           | HYDROGEN ENERGY AND TECNOLOGIES                                                                                                                                                                                                             |                                                                                                                                                                                        |
| <b>2</b>  | Course Code:                                            | MAK4434                                                                                                                                                                                                                                     |                                                                                                                                                                                        |
| <b>3</b>  | Type of Course:                                         | Optional                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
| <b>4</b>  | Level of Course:                                        | First Cycle                                                                                                                                                                                                                                 |                                                                                                                                                                                        |
| <b>5</b>  | Year of Study:                                          | 4                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
| <b>6</b>  | Semester:                                               | 8                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
| <b>7</b>  | ECTS Credits Allocated:                                 | 3.00                                                                                                                                                                                                                                        |                                                                                                                                                                                        |
| <b>8</b>  | Theoretical (hour/week):                                | 2.00                                                                                                                                                                                                                                        |                                                                                                                                                                                        |
| <b>9</b>  | Practice (hour/week):                                   | 0.00                                                                                                                                                                                                                                        |                                                                                                                                                                                        |
| <b>10</b> | Laboratory (hour/week):                                 | 0                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
| <b>11</b> | Prerequisites:                                          | -                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
| <b>12</b> | Language:                                               | Turkish                                                                                                                                                                                                                                     |                                                                                                                                                                                        |
| <b>13</b> | Mode of Delivery:                                       | Face to face                                                                                                                                                                                                                                |                                                                                                                                                                                        |
| <b>14</b> | Course Coordinator:                                     | Prof. Dr. Akın Burak Etemoğlu                                                                                                                                                                                                               |                                                                                                                                                                                        |
| <b>15</b> | Course Lecturers:                                       | Dr.Öğr.Üyesi Burak Türkan                                                                                                                                                                                                                   |                                                                                                                                                                                        |
| <b>16</b> | Contact information of the Course Coordinator:          | Prof.Dr. Akın B. Etemoğlu<br>e-posta: aetem@uludag.edu.tr<br>telefon: 224 2941976<br>adres: BUÜMF, Makine Müh. Blm.                                                                                                                         |                                                                                                                                                                                        |
| <b>17</b> | Website:                                                |                                                                                                                                                                                                                                             |                                                                                                                                                                                        |
| <b>18</b> | Objective of the Course:                                | Explaining energy sources and their importance. Hydrogen energy and technologies, applications of fuel cells and examination of the process from obtaining hydrogen as a fuel to its usability.                                             |                                                                                                                                                                                        |
| <b>19</b> | Contribution of the Course to Professional Development: | Acquiring practical knowledge and skills on the use and projecting of alternative fuel source hydrogen energy (fuel cell, storage, etc.) that will be used today and in the future, together with the learning of renewable energy sources. |                                                                                                                                                                                        |
| <b>20</b> | Learning Outcomes:                                      |                                                                                                                                                                                                                                             |                                                                                                                                                                                        |
|           |                                                         | <b>1</b>                                                                                                                                                                                                                                    | To provide basic knowledge about classical and renewable energy sources.                                                                                                               |
|           |                                                         | <b>2</b>                                                                                                                                                                                                                                    | To provide information about the advantages, usage areas and current hydrogen technologies of hydrogen energy.                                                                         |
|           |                                                         | <b>3</b>                                                                                                                                                                                                                                    | To have the ability to design by considering the properties of hydrogen, the storage and transportation of hydrogen energy, obtaining hydrogen as a fuel and its conversion to energy. |
|           |                                                         | <b>4</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>5</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>6</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>7</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>8</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>9</b>                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|           |                                                         | <b>10</b>                                                                                                                                                                                                                                   |                                                                                                                                                                                        |
| <b>21</b> | Course Content:                                         |                                                                                                                                                                                                                                             |                                                                                                                                                                                        |
|           |                                                         | <b>Course Content:</b>                                                                                                                                                                                                                      |                                                                                                                                                                                        |
| Week      | Theoretical                                             | Practice                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
| <b>1</b>  | Basic concepts                                          |                                                                                                                                                                                                                                             |                                                                                                                                                                                        |



| LO: Learning Objectives    PQ: Program Qualifications |            |       |          |        |             |
|-------------------------------------------------------|------------|-------|----------|--------|-------------|
| Contrib<br>ution<br>Level:                            | 1 very low | 2 low | 3 Medium | 4 High | 5 Very High |