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| **Course Plan for Alternative Energy Technology (Bachelor Program) No.: (2021-2022)** |
| **Approved by Deans Council by decision (09/19/2020-2021) dated (28/07/2021)** |
| **)132) Credit Hours** | **Study system / hybrid program** |
| **Type of specialty** | * **Humanities**
 | * **Scientific / technical**
 | * **Medical Sciences**
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| **Teaching style** | **Percentage of study plan hours / number** | **Model used (synchronous: asynchronous)** |
| **Complete e-learning courses** | 20% / 27 CH  | 1:1 (For THER. SAT.)  |
| **Blended Learning courses (For Humanity)** | 40% - 60% Maximum / number( ) | 1:1 (For SUN. TUE.) or (MON. WED.) |
| **Blended learning courses (for scientific and medical)** | 37% / 49 CH  | 1:1 (For SUN. TUE.) or (MON. WED.) |
| **Traditional learning courses (for humanity)** | 20% Minimum / number ( ) C h  | 2:0 For all academic divisions |
| **Traditional learning courses (for scientific and medical)** | 43% / 56 CH  | 2:0 For all academic divisions |

Important note: (The teaching patterns of the subjects are distributed at all academic levels in the program)

Program vision: Towards a competitive faculty committed to excellence in teaching, innovative research, entrepreneurship and community service.

Program mission and objectives:

1. Develop knowledge and skills in the field of alternative engineering technology.

2. Attain a high level of professionalism and ethical responsibilities.

 3. Have the ability to interact with others as leaders and team members.

4. Ability to continue their education in alternative engineering technology or any other lifelong learning program

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

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| **Main knowledge** |
| MK1 | Developing knowledge in the basic sciences of mechanical engineering, such as thermal and applied mechanics sciences  |
| MK2 | Developing knowledge in the basic sciences of electrical engineering, such as electrical and electronic circuits, electrical machines and power systems. |
| MK3 | Developing knowledge in the basic sciences of traditional energy resources, their economics, management and obstacles and understanding the principles of energy conversion systems, power plants and their environmental impact. |
| MK4 | Developing knowledge in the basic sciences of various renewable energy resources, as well as auditing and conserving of renewable energy |
| **Basic skills** |
| MS1 | Attaining the skill of critical and logical thinking to identify the strengths and weaknesses, developing design, installation, and maintenance skill sets of renewable energy projects, in addition to the ability to identify problems and find their appropriate solutions |
| MS2 | Developing project management skills related to various renewable energy resources |
| MS3 | Attaining skills in using specialized technologies in the field of renewable energy using various specialized softwares in the field of renewable energy |
| MS4 | Developing the skills of time and resources management and the ability to function effectively as a member as well as a leader on technical teams. |
| **General competencies** |
| MC1 | The ability to manage projects, economic planning, implementation of alternative energy projects and systems. |
| MC2 | The ability to take responsibility and make the necessary decisions to implement plans related to alternative energy projects |
| MC3 | An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature  |
| MC4 | An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes  |
| MC5 | An ability to function effectively as a member as well as a leader on technical teams |

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| Teaching style | Course No. | Course name | Credit hour | Theory Hours | Practical Hours | PrerequisiteCo-requisite | Indicative |
| Fully electronic learning | Blended learning | Traditional learning | Semester | year |
| 1. **Faculty Requirements (21) Credit Hours**
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|  |  | • | 0120121 | Calculus I | 3 | 3 | 0 |  | 1 | 1 |
|  |  | • | 0150111 | General physics I | 3 | 3 | 0 |  | 1 | 1 |
|  |  | • | 0150101 | General physics lab I | 1 | 0 | 3 | (Co.) General physics | 1 | 1 |
|  |  | • | 0911102 | Engineering drawing | 3 | 0 | 6 | - | 1 | 1 |
|  |  | • | 0905111 | Principles of electrical circuits | 3 | 3 | 0 | General physics I | 2 | 1 |
|  | • |  | 0908201 | Technical writing and profession ethics | 2 | 2 |  | English language I | 2 | 1 |
|  |  | • | 0101104 | Calculus 2 for engineering student | 3 | 3 | 0 | Calculus I | 2 | 1 |
|  |  | • | 0909101 | Engineering computer application | 3 | 3 | 0 | Remedial computer Skills | 2 | 1 |

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| Teaching style | Course No. | Course name | Credit hour | Theory Hours | Practical Hours | PrerequisiteCo-requisite | Indicative |
| Fully electronic learning | Blended learning | Traditional learning | Semester | year |
| 1. **Major requirements (84 ) Credit Hours**
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| 3.1 **Mandatory requirements ( 77 ) credit hours** |
|  | • |  | 0906201 | Workshop and occupational safety | 3 | 1 | 4 | - | 1 | 2 |
|  |  | • | 0906210 | Electrical machines and power systems | 3 | 3 | 0 | Principles of electrical circuits | 1 | 2 |
|  |  | • | 0906213 | Electrical circuit lab | 1 | 0 | 3 | (Co.)Principles of electrical circuits | 1 | 2 |
|  | • |  | 0906220 | Engineering mechanics | 3 | 3 | 0 | General physics IEngineering drawing | 1 | 2 |
|  |  | • | 0906225 | Thermodynamics | 2 | 2 | 0 | General physics I | 1 | 2 |
|  |  | • | 0906211 | Electrical machines and power systems lab | 1 | 0 | 3 | Electrical machines and power systems | 2 | 2 |
|  |  | • | 0906223 | Fluid mechanics | 2 | 2 | 0 | General physics I | 1 | 2 |
|  | • |  | 0906314 | Instrumentations and measurements | 3 | 3 | 0 | Principles of electrical circuits-fluid mechanics | 2 | 2 |
|  | • |  | 0906323 | Strength of materials | 3 | 3 | 0 | Engineering mechanics | 2 | 2 |
|  |  | • | 0906325 | Heat transfer | 2 | 2 | 0 | Thermodynamics | 2 | 2 |
|  | • |  | 0906230 | Conventional energy resources | 3 | 3 | 0 | General physics I | 1 | 3 |
|  |  | • | 0906316 | Electronics circuits | 3 | 3 | 0 | Principles of Electrical Circuits | 1 | 3 |
|  |  • |  | 0906335 | Combustion processes | 3 | 3 | 0 | Thermodynamics | 1 | 3 |
|  | • |  | 0906344 | Solar thermal energy workshop | 3 | 0 | 6 | Heat transfer | 1 | 3 |
|  | • |  | 0906345 | Solar electric energy workshop | 3 | 0 | 6 | Alternative energy (1) | 1 | 3 |
|  |  | • | 0906302 | Simulation and modeling lab | 3 | 0 | 6 | (Alternative energy (1) | 2 | 3 |
|  |  | • | 0906317 | Electronics circuits lab | 1 | 0 | 3 | Electronics circuits | 1 | 3 |
|  |  | • | 0906336 | Energy conversion | 3 | 3 | 0 | Thermodynamics | 2 | 3 |
|  |  | • | 0906334 | Combustion lab | 1 | 0 | 3 | (Co.)Combustion processes | 1 | 3 |
|  |  • |  | 0906346 | Alternative energy (1) | 3 | 3 | 0 | Principles of electrical circuits | 1 | 3 |
|  |  • |  | 0906434 | Energy Economics and Management | 2 | 2 | 0 | Alternative energy (1) | 1 | 4 |
|  |  • |  | 0906448 | Alternative energy (2) | 3 | 3 | 0 | Alternative energy (1) | 2 | 4 |
|  |  • |  | 0906449 | Bioenergy and waste management  | 2 | 2 | 0 | Conventional energy Resources | 1 | 4 |
|  |  • |  | 0906454 | Wind energy workshop | 3 | 0 | 6 | Instrumentations and measurements | 2 | 4 |
|  |  | • | 0906301 | Industrial training | 6 | 0 | 12 | Passing 90 credit | 3 | 3 |
|  |  • |  | 0906404 | Energy efficiency workshop | 3 | 0 | 6 | Energy conversionEnergy Economics and Management | 2 | 4 |
|  |  • |  | 0906433 | Environmental pollution | 2 | 2 | 0 | Combustion processes | 1 | 4 |
|  |  • |  | 0906455 | Hybrid systems Workshops | 2 | 0 | 4 | Solar Electric PV energy workshop | 1 | 4 |
|  |  | • | 0906401 | Graduation project I | 1 | 0 | 2 | Passing 90 credit | 1 | 4 |
|  |  |  • | 0906402 | Graduation project II | 2 | 0 | 4 | Graduation project I | 2 | 4 |
|  | • |  | 0906430 | Power plants | 2 | 2 | 0 | Thermodynamics | 2 | 4 |
| * 1. **electives requirements ( 0 ) credit hours**
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| **3.3 supporting requirements ( 7 ) credit hours** |
|  | • |  | 0911273 | Fundamentals of materials science | 3 | 3 | 0 | General physics 1 | 1 | 2 |
|  |  | • | 0911214 | Strength of materials lab | 1 | 0 | 3 | (Co.)Strength of material | 2 | 2 |
|  |  | • | 0911323 | Thermodynamics lab | 1 | 0 | 3 | (Co. ) thermodynamics | 2 | 2 |
|  |  | • | 0911325 | Fluids Mechanics lab | 1 | 0 | 3 | (Co.) Fluids mechanics | 2 | 2 |
|  |  | • | 0911452 | Engineering measurements lab | 1 | 0 | 3 | (Co.) Engineering measurements | 2 | 2 |

The end of the study plan for the major students

Subjects taught in the major for students of other majors (university requirements, college requirements, major family requirements, support requirements)

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| Teaching style | Course No. | Course name | Credit hour | Theory Hours | Practical Hours | The type of requirement and the recipient |
| Fully electronic learning | Blended learning | Traditional learning |
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