# TEP 751 Energy Analysis (S3)

## ENERGY ANALYSIS FOR BIOSYSTEM ENGINEERING

<table>
<thead>
<tr>
<th>#</th>
<th>Topics</th>
<th>Purpose of lecture</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Scope of the lecture: Energy situation, worldwide and in Indonesia</td>
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<tr>
<td>2</td>
<td>Exergy as tool of analysis</td>
<td>To review the basic concept of thermodynamics, with emphasis on the first and second law</td>
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<tr>
<td>3</td>
<td>To understand the fundamental concept of exergy and its utilization in the analysis of energy production and utilization</td>
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<td>4</td>
<td>Case study of exergy analysis</td>
<td>To perform energy and exergy analysis in heat exchanger and energy storage system</td>
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<td>5</td>
<td>To perform energy and exergy analysis in refrigeration system</td>
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<td>6</td>
<td>To perform energy and exergy analysis in drying system</td>
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<td>7</td>
<td>Utilization of renewable energy</td>
<td>To evaluate the energy and exergy concept of renewable energy use in agricultural process</td>
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<td>8</td>
<td>Project I</td>
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<td>9</td>
<td>Agro-based Industrial Energy</td>
<td>To evaluate the energy and exergy concept and utilization in agro-based industry</td>
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<td>10</td>
<td>To evaluate the energy utilization and efficiency in agro-based industry. Case study: energy utilization in sugar cane industry</td>
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<td>11</td>
<td>LCA as tool of analysis</td>
<td>To understand the LCA concept and its standardized procedure (ISO140410)</td>
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To understand the use of LCA as an environment sustainability tool
To overview the LCA study of biodiesel production.