<table>
<thead>
<tr>
<th>TSC Category</th>
<th>Engineering and Maintenance</th>
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<tbody>
<tr>
<td>TSC</td>
<td>Automated Process Design</td>
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<tr>
<td><strong>TSC Description</strong></td>
<td>Design processes that utilise automated manufacturing equipment and control systems</td>
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<tr>
<th>TSC Proficiency Description</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
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<tr>
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<td>BPM-ENM-3003-1.1</td>
<td>BPM-ENM-4003-1.1</td>
<td>BPM-ENM-5003-1.1</td>
<td>BPM-ENM-6003-1.1</td>
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<tr>
<td>Conduct research to support the introduction of automated manufacturing equipment and control systems</td>
<td>Design production processes that utilise automated manufacturing equipment and control systems</td>
<td>Drive the introduction of new production processes that utilise automated manufacturing equipment and control systems to enhance operational efficiency</td>
<td>Explore new applications of automated methods of manufacturing using expertise within the field to transform production workflows</td>
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**Knowledge**
- Types and features of automated equipment and control systems used in biopharmaceuticals manufacturing
- Methods of producing production flow maps
- Rejection parameters used for automated equipment
- Current Good Manufacturing Practices (CGMPs)
- Types and functions of sensors used in production processes
- Types of data outputs that can be obtained from using sensors
- Methods of conducting feasibility studies for new automated equipment
- Types of automated equipment simulation tools
- Methods of constructing two-dimensional (2D) and three-dimensional (3D) technical drawings
- Production process steps
- Operational targets for production processes
- Financial costs of introducing automation to production processes
- Methods of conducting return-on-investment (ROI) analyses
- Macro trends and their impact on biopharmaceutical manufacturing
- Applications of emerging automation technologies
- Impact of automation to biopharmaceuticals manufacturing operations
- Principles of change management
- Principles of risk management
- Robotics and automation legislative requirements

**Abilities**
- Conduct research to compare manual processes with automation and identify implications on existing processes
- Explore information on automated processes applied by competitors or industry leaders in the sector, or used in adjacent industries
- Identify production process steps that could be conducted using automated equipment
- Determine control requirements of automated systems
- Plan routes for mobile robots
- Establish acceptance criteria for robot performance
- Review automation proposals for production processes against operational requirements
- Evaluate the extent to which the new automated process complies with Current Good Manufacturing Practices (CGMPs)
- Assess the cost and return on investment of
- Synthesise innovative developments in the biopharmaceutical manufacturing industry
- Anticipate macro trends and their impact on speed, process, or automation requirements in the biopharmaceutical manufacturing
- Lead innovation in automation of production processes
| Map production processes to new automated equipment | Define sensor and operational configuration to ensure control, measuring and feeding mechanisms will function appropriately | Facilitate implementation of new automated processes | Evaluate different automation approaches to select interventions that enhance precision and productivity |
| Set rejection parameters for out of control products for automated processes | Assess feasibility of automating specific parts of the manufacturing processes | Develop a report that evaluates whether the automated design meets functional requirements | Develop organisational automation implementation strategies |
| | Implement new automated processes and adjust designs as necessary | | Synergise the use of automation with new and existing production processes |