## 🛠️ Module 7: Applied Sciences - Innovation in Action

### *(Science – Interdisciplinary Applications & Engineering Integration)*

### 🛠️ Core Focus

**Applied science is where theory meets impact.**  
This module explores how scientific disciplines intersect to drive innovation across medicine, agriculture, engineering, and environmental systems—emphasizing design, creativity, and solutions for real-world problems.

### 🧠 Key Concepts & Learning Goals

| Theme | Topics |
| --- | --- |
| **1. What is Applied Science?** | - Bridging theory and practice- Examples from history and modern breakthroughs- Role in society and economy |
| **2. Engineering Principles** | - Design thinking process- Iteration, prototyping, and optimization- Problem-solving frameworks |
| **3. Biomedical Sciences** | - Disease prevention and treatment- Vaccines, diagnostics, and medical devices- Bioethics and access to healthcare |
| **4. Agricultural Sciences** | - Food production and food tech- Soil, water, and pest management- Sustainable and climate-smart agriculture |
| **5. Materials Science** | - Metals, polymers, ceramics, and composites- Smart materials and nanomaterials- Custom materials for specific challenges |
| **6. Environmental Science & Engineering** | - Pollution mitigation- Renewable energy systems- Water purification, conservation, and waste management |
| **7. Interdisciplinary Science in Action** | - Biochemistry, geophysics, astrobiology, bioinformatics- Combining disciplines for new frontiers- Case studies and innovation labs |
| **8. Communicating Innovation** | - Public engagement and science communication- Storytelling and design in presenting solutions- Role of art in science translation and impact- **Entrepreneurship and pitching scientific ideas**- **Basics of intellectual property and patents** |

### 🧪 Hands-On Activities

* **Prototype a Product** (use design thinking to solve a problem)
* **Engineering Redesign Challenge**
* **Build a Biofilter or Water Purifier**
* **Medical Tech Hackathon**
* **Science Communication Showcase**

### 🧩 STEAM Integration

* **Science**: Core knowledge in biology, chemistry, physics, and earth science
* **Technology**: Tools and digital modeling, medical devices
* **Engineering**: Innovation, design, and testing
* **Arts**: Infographics, industrial design, science visualizations
* **Math**: Metrics, data analysis, modeling

### 🌐 21st Century Skills Emphasized

* Innovation & Design Thinking
* Research Application
* Systems Engineering
* Communication & Collaboration