



**ST ALOYSIUS**  
(DEEMED TO BE UNIVERSITY)  
MANGALURU 575 003 - INDIA

SCHOOL OF  
**ENGINEERING**

MODULE 1

# INTRODUCTION TO INNOVATION

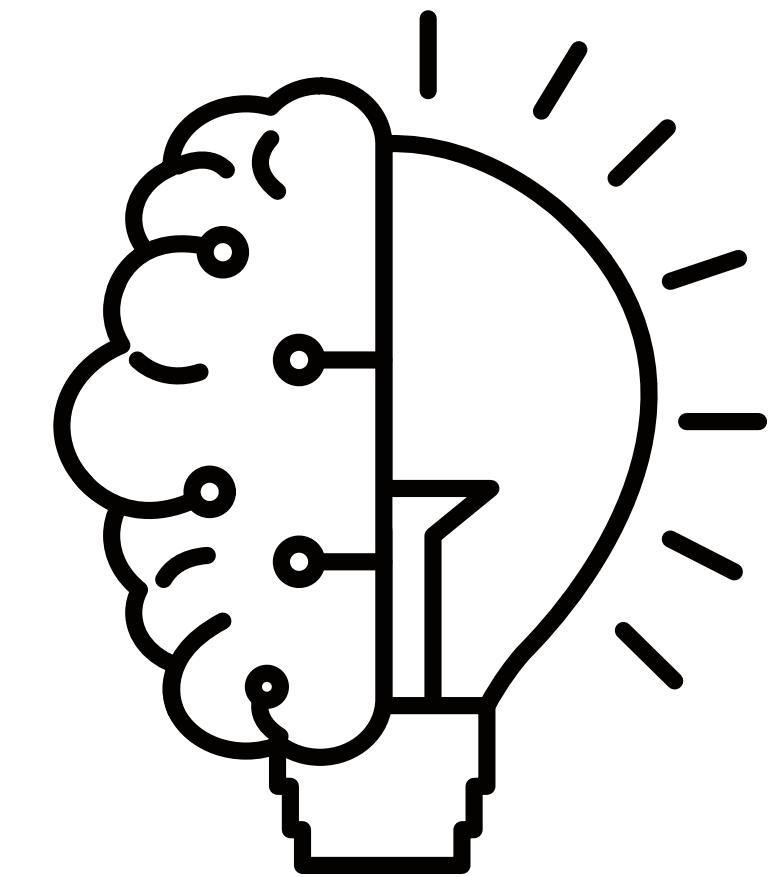
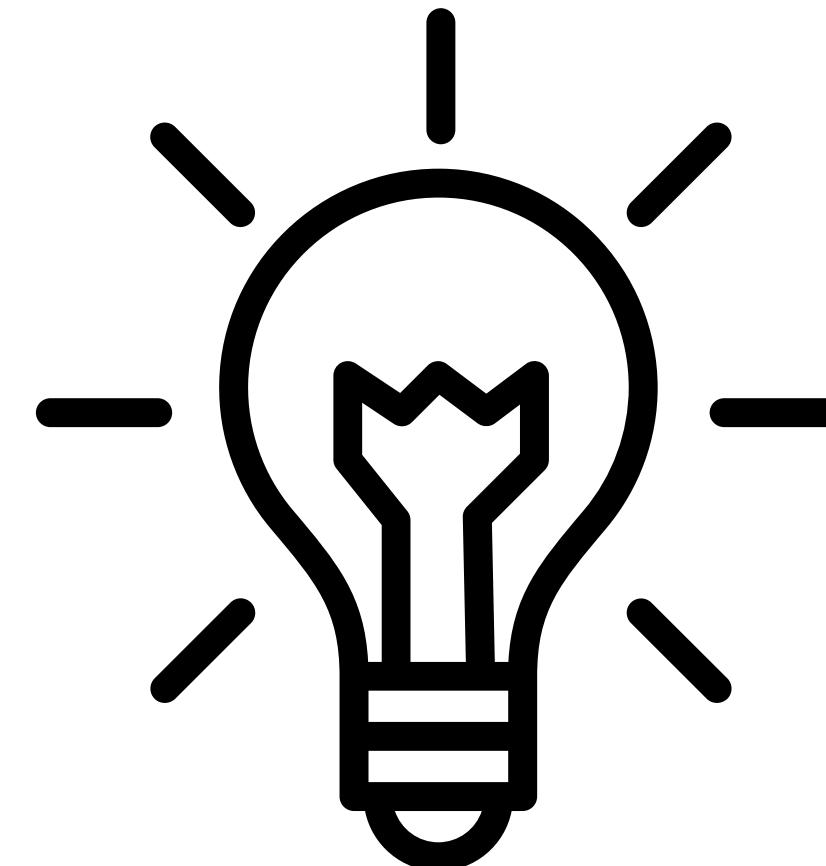


# Module

- Innovation vs. Invention vs. Creativity,
- Types of Innovation: Product, Process, Business Model, Social
- Importance of Innovation in Industry 4.0
- Role of Innovation in Engineering and Entrepreneurship
- Case Studies from Tesla, Apple, Local Engineering Solutions
- Creativity and Ideation Techniques: Brainstorming, Mind Mapping, SCAMPER, Six Thinking Hats
- Problem Identification and Opportunity Mapping, Identifying User Pain Points and Unmet Needs



# INNOVATION VS INVENTION



# Invention

The creation of a completely new product, process, or method that did not exist before.

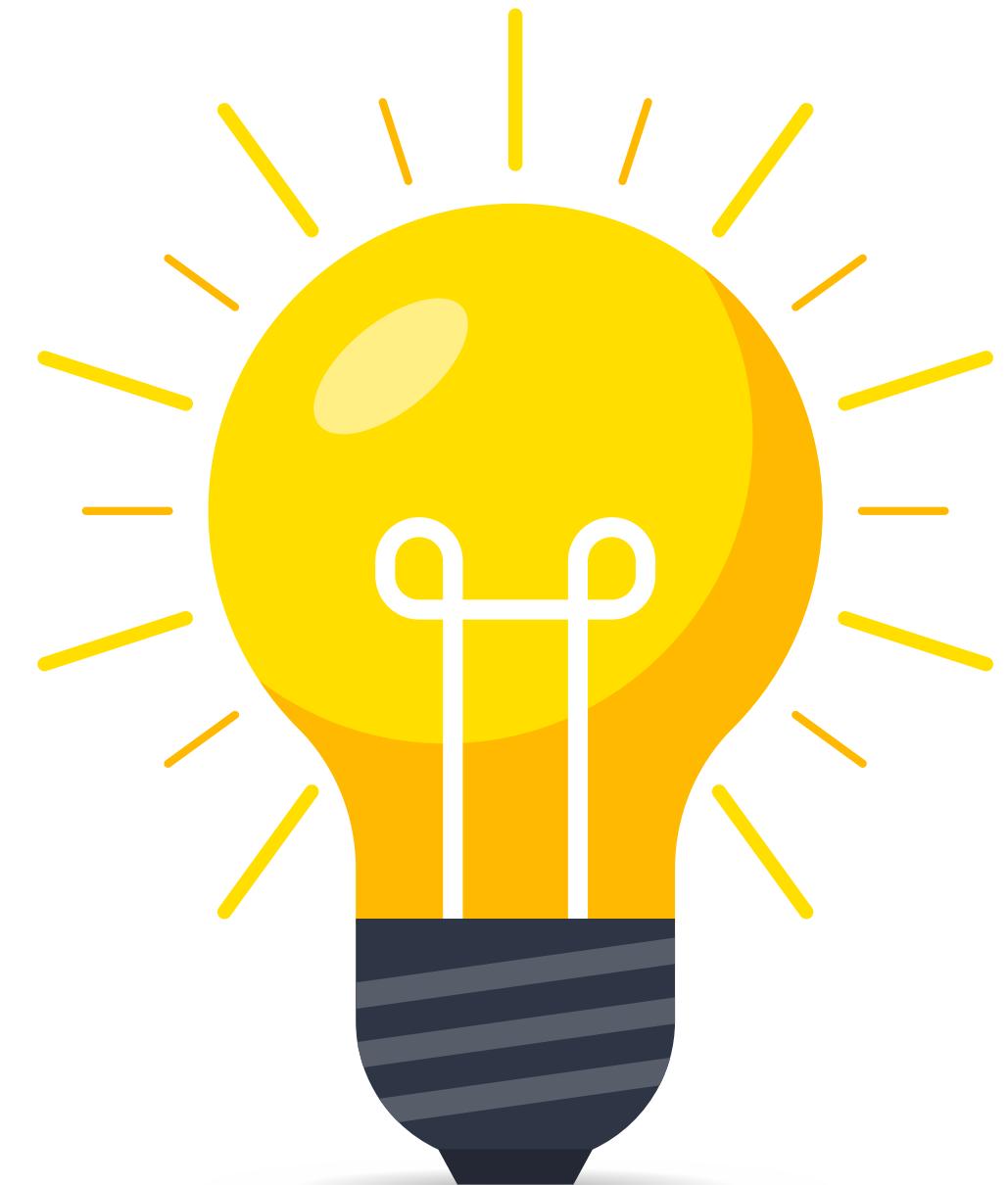
- **Novelty:** Inventions introduce something entirely new, not just an improvement.
- **Original idea:** Based on research, experimentation, or discovery.
- **Can exist without immediate practical application:** Not every invention is commercialized or widely adopted. Ex: Laser, Plastic

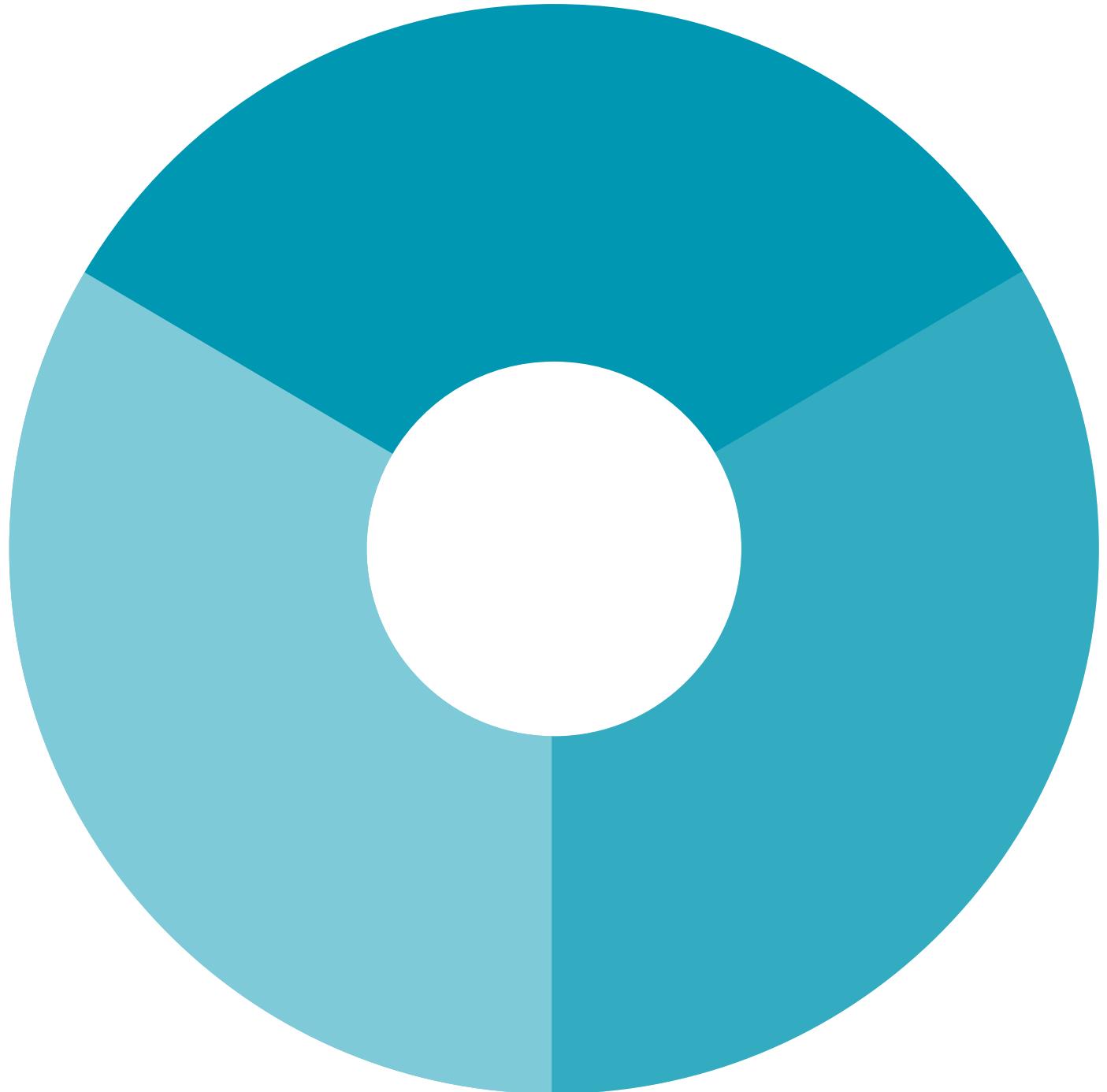


# Innovation

The process of taking a new or creative idea and applying it to create value, whether through a new product, service, process, or business model.

- **Application of ideas** – Innovation is not just thinking; it involves implementing the idea.
- **Value creation** – It must provide practical benefits, improve efficiency, solve problems, or meet a need.
- **Novelty or improvement** – Can be a completely new invention or an improvement/adaptation of something existing.
- **Scalability or adoption** – Often involves making the idea usable, accessible, or commercially viable.





# Form groups



# Categorize

- Electric car battery
- QR codes
- Swiggy
- CRISPR gene editing
- PayTM
- Self-driving car technology
- Solar lanterns
- Touchscreen displays
- Microfinance (Grameen Bank)
- Wireless electricity transmission
- 3D printing of houses
- Velcro
- UPI payments
- Voice assistants (Alexa)
- E-rickshaws
- Smart contact lenses
- Internet
- Graphene
- Blockchain
- MRI machine
- Online grocery delivery apps
- Foldable smartphones
- Drone delivery systems
- Electric scooters
- Smart thermostats (like Nest)
- 3D-printed prosthetics
- Wearable fitness trackers
- LED lights
- Autonomous vacuum cleaners (Roomba)
- Biodegradable plastics



Item	Invention/Innovation	Reasoning
Electric car battery	Innovation	Batteries existed; adapted for electric cars efficiently.
QR codes	Invention	New method to store and read information.
Swiggy	Innovation	Existing food delivery model optimized with tech/logistics.
CRISPR gene editing	Invention	Completely new method to edit genes.
PayTM	Innovation	Digital wallet applied for mobile payments in India.
Self-driving car technology	Innovation	Cars existed; autonomy applied via AI and sensors.
Solar lanterns	Innovation	Solar panels existed; combined into portable lanterns.
Touchscreen displays	Invention	New method for input and display interaction.
Microfinance (Grameen Bank)	Innovation	Lending existed; model adapted for small-scale borrowers.
Wireless electricity transmission	Invention	Novel technology to transmit electricity without wires.



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# CREATIVITY

Is Creativity important for invention?



# 5 famous accidental inventions:

- Penicillin – Alexander Fleming noticed mold killing bacteria in his lab, leading to the world's first antibiotic.
- Microwave Oven – Percy Spencer realized a chocolate bar melted near radar equipment, which led to cooking with microwaves.
- Post-it Notes – Spencer Silver invented a low-tack adhesive by accident while trying to create a strong glue.
- X-rays – Wilhelm Roentgen discovered X-rays while experimenting with cathode rays.
- Velcro – George de Mestral was inspired by burrs sticking to his clothes, creating the hook-and-loop fastener.

- Imagining a city in the clouds or floating buildings.
- Designing a new language or alphabet just for fun.
- Conceptualizing a movie where time runs backward.
- Drawing animals that don't exist, like hybrid creatures.
- Writing a story from the perspective of an inanimate object.
- Sketching futuristic fashion that defies current materials or physics.
- Creating a board game with completely new rules.
- Imagining machines powered by emotions or thoughts.
- Brainstorming alternate endings for famous historical events.
- Designing a theme park on another planet.



<b>Stage</b>	<b>Definition</b>	<b>Example</b>	<b>Key Point</b>
<b>Creativity</b>	Generating novel ideas or imagining possibilities	Imagining a car that can fly	Idea generation; may or may not be practical
<b>Invention</b>	Creating something entirely new that did not exist before	QR codes, CRISPR gene editing	Novel creation; may not be immediately usable or commercialized
<b>Innovation</b>	Applying an idea or invention to create practical value	UPI payments, 3D-printed houses	Implementation, usability, and value creation

# Thank you!