Subject: Introduction to research

Methodological Teaching Unit
Semester : 1
Number of weeks: 14
Hourly Volume (HV) per week of the lesson : 1H30
HV per Semester: 22H30
Coefficient : 3
Number of credits : 2
Assessment Mode: 100% Exam

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GENERAL OBJECTIVES OF THE TEACHING SUBJECT

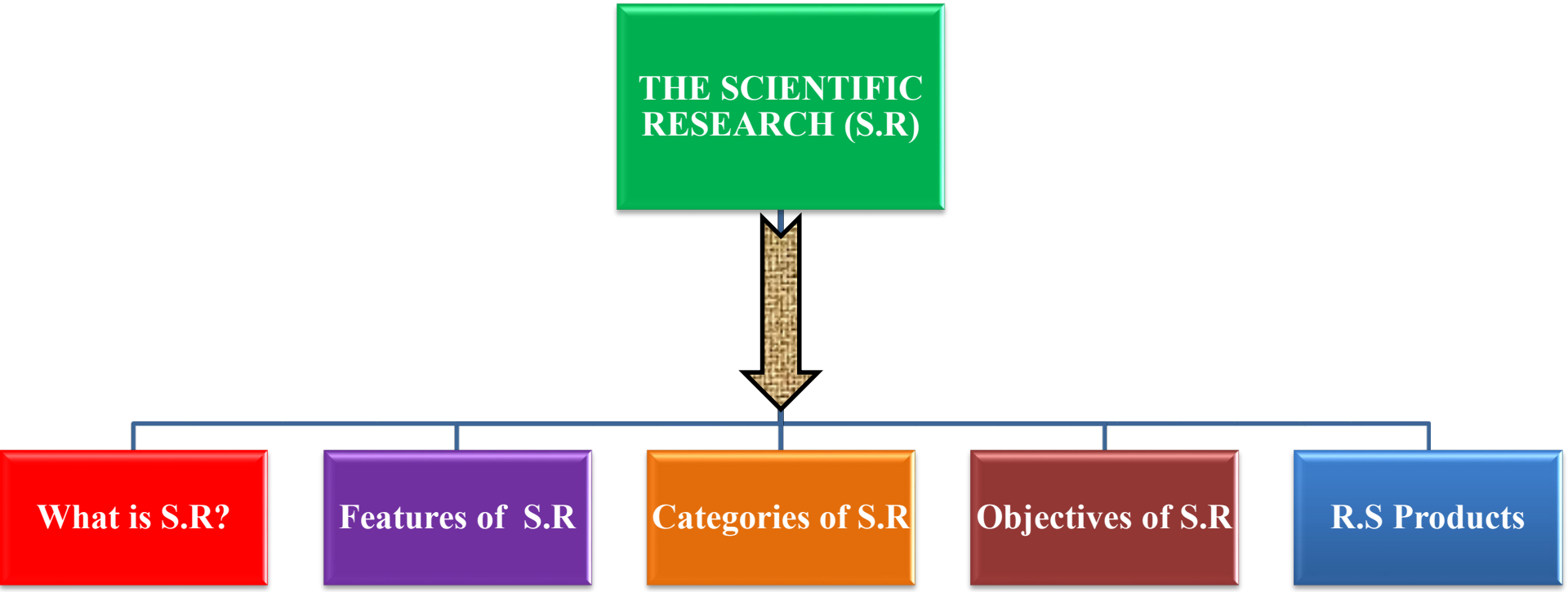
- Introduction to scientific research
- Acquisition of basic research concepts and tools
- Acquiring the fundamental tools to complete end-of-study dissertations

LEARNING OBJECTIVES

- Construction of research objects, problems and arguments
- Definition of objectives and approaches (methods)

CONTENT OF TEACHING MATERIAL

- The characteristics of science
- The scientific research
- The approach methodology
- Formulation of the research problem
- Putting the research problem into operation


THE SCIENTIFIC RESEARCH (S.R)
What is S.R?
Features of S.R
Categories of S.R
Objectives of S.R
R.S Products

What is scientific research?

The S.R. is the set of actions undertaken to produce and develop new scientific knowledge, based on in-depth investigations and objective critics, through:

-The examination of phenomena and their discovery
-Resolving problems and obtaining precise answers
-Criticism or contestation of the results provided in previous work or a thesis
-Experiment with a new process, a new solution, a new theory
-Apply a practice to a phenomenon
-Describe, explain or understand a phenomenon
-Predict facts, phenomena and behavior

Following…..

-It consists of a rational (judicious, reasonable), organized and rigorous approach to studying and understanding.

-It raises the level of thought, deepens through reflection and criticism of areas already opened, explores through reasoning, intuition (inspiration, spirit) and experience still unknown areas of our universe.

-It is carried out according to the rules of the scientific method

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-It is carried out according to the rules of the scientific method.

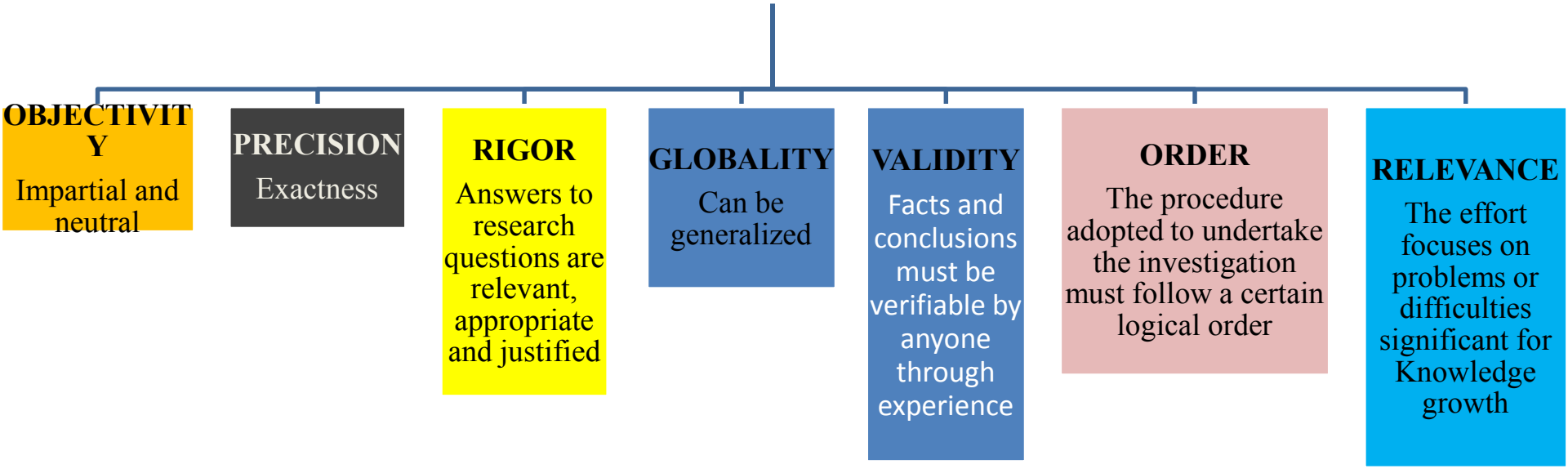
-Its primary function is the formulation of new questions and the production of new knowledge.

-It contributes to creating or charting the future through progress in all areas of knowledge, as well as through the dissemination and sharing of these advances with society.

It constitutes both a means of training individuals to discover the world and understand it, and a source of technological and social innovations.

Research therefore requires the communication and dissemination of its results.

FEATURES of the Scientific Research



CATEGORIES of Scientific Research related to its USE

FONDAMENTAL RESEARCH

Consists of experimental or theoretical work undertaken mainly:

-In order to acquire new knowledge on the foundations of phenomena and observable facts, without considering a particular application or use.

-To analyze properties, structures and relationships to formulate and test hypotheses, theories or laws, etc.

APPLIED RESEARCH

Consists of original work undertaken with the aim of acquiring new knowledge, especially directed towards a specific goal or practical objective. The knowledge or information derived is often patented but can also be kept secret.

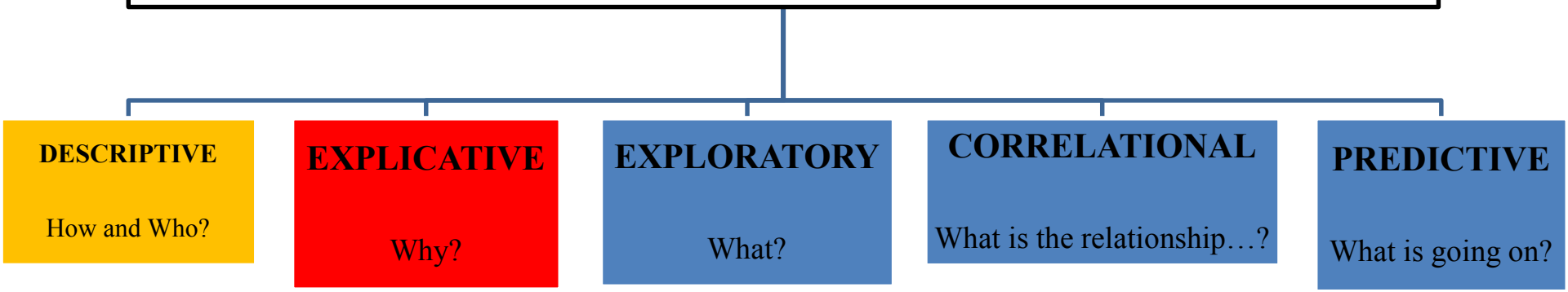
DEVELOPMENT RESEARCH

Consists of work based on existing knowledge obtained through research and/or practical experience with a view to:

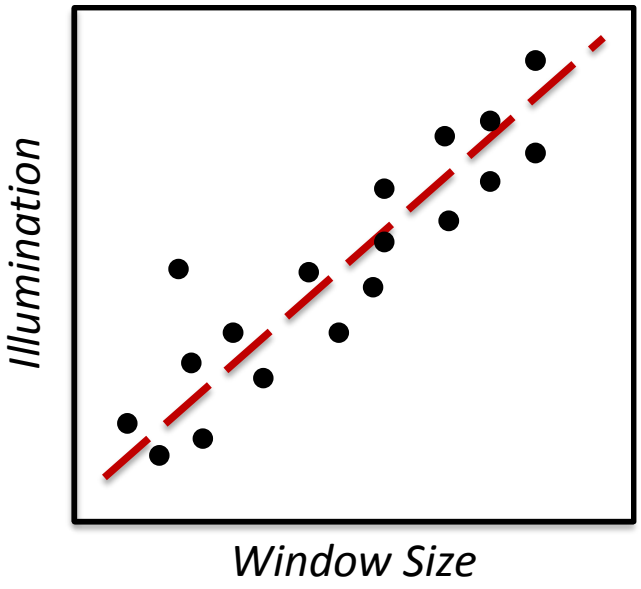
-applying this knowledge to launch the manufacturing of new materials, products or devices, to establish new processes, systems and services

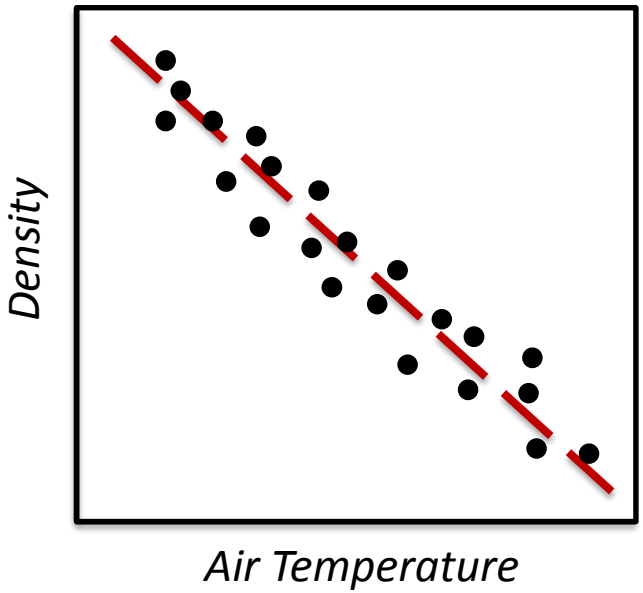
–and/or considerably improve those that already exist

CATEGORIES
OF Scientific Research
Depending on the desired
RESEARCH OBJECTIVES



	Main goals and methods used	
DESCRIPTIVE	-To describe in depth a little-known phenomenon. -Describe what exists by generating new ideas -Find new ideas that contradict old data -Clarify a series of steps (process) -Document a causal mechanism or process -Provide a detailed and accurate image	
EXPLICATIVE	-To understand why or under what conditions such phenomena or events occur. -Test a theory -Develop and enrich the explanation of a theory -Support or refute an explanation -Determine which explanation among more is better -Clarify the relationships between Phenomena	
EXPLORATORY	-To identify problems or properties of poorly documented complex situations or events. -Become familiar with facts, situations and concerns basic -Formulate questions, define a problem for future research -Generate new ideas, hypotheses	***The methods used are: survey; interview with specialists; documentation review; case studies; introspection (examination, criticism, etc.)***
CORRELATI -ONAL	-To check if there is a relationship between factors and establish the degree of relationship (correlation) -Verify the hypothesis of a causal relationship between variables, -Checks the nature of the relationship, -The related factors, -The direction of the relationship -The consequences of the relationship. In case the factors vary in the same direction, we speak of associations positive. If the factors vary in opposite directions, we will speak	***The methods used are: control variables, observation*** ***For example, testing the hypothesis "listening to music leads hypotension." There are 2 ways that conduct the research:*** ***-Experience: takes a group of people and make them listen to the music then compares the voltage.*** ***-Survey: ask people how they feel? how***





POSITIVE CORRELATION

Between 2 variables (Window Size vs **illumination)**

The more the size of a window increases, the more the illumination increases

REVERSED CORRELATION (NEGATIVE)

Between 2 variables (temperature of the air vs **density)**

The more the air temperature increases, the more the density decreases

OBJECTIVES of the Scientific Research

GLOBAL OBJECTIVES

-Production of scientific knowledge and contribution to the development of knowledge based on the study of a given problem or phenomenon,
-Contribute to economic and social development,
-Dissemination of knowledge to feed new thoughts, to open new perspectives for research but also for action.

IMMEDIATE OR DIRECT OBJECTIVES

- Explore a phenomenon
- Solve a problem
-Question or refute results provided in previous work or a thesis
- Experiment with a new process, a new solution, a new theory
- Describe a phenomenon
- Explain a phenomenon
-Experimentally demonstrate a cause and effect link between a supposed factor of a phenomenon and a variable (an aspect) of the phenomenon studied,
-Test a prediction deduced from a theoretical model,
-Demonstrate the existence of a serious (regular, significant) relationship between two or more variables relating to the phenomenon studied;
-Identify the phenomenon studied by identifying its most important or most promising aspects or components;
-Establish or improve methods and processes for studying a phenomenon.

PRODUCTS
of Scientific Research

The Scientific Research aims to produce scientific knowledge which can take various forms:

-Publications of scientific articles in journals

-Thesis dissertation

-Oral communications without proceedings

-Communications with Proceedings,

-Edited works,

-Technical reports,

-Monograph (is originally a non-periodic Book or Treatise. Nowadays, this term is mainly used when we speak of an "exhaustive study relating to a precise and limited subject or to a character").

-Patents (private research)